



FMC Idaho LLC, Pocatello, Idaho

**FMC OU REMEDIAL ACTION
DUST CONTROL AND
AIR MONITORING PLAN**

Revision 1.0

October 2014

FMC OU
DUST CONTROL AND AIR MONITORING PLAN
Eastern Michaud Flats Site
Power County, ID
Revision 1.0

Prepared for:
MWH Americas, Inc.
2890 East Cottonwood Parkway, Suite 300
Salt Lake City, UT 84121

Prepared by:
Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

Bison Engineering
1400 11th Avenue
Helena, MT 59601

October 2014

TABLE OF CONTENTS

LIST OF TABLES	iii
LIST OF FIGURES	iii
LIST OF APPENDICES	iv
1.0 REGULATORY REQUIREMENTS.....	1-1
2.0 DUST SUPPRESSION MEASURES.....	2-1
2.1 DUST SUPPRESSION.....	2-1
2.1.1 Excavation and Grading.....	2-2
2.1.2 Haul.....	2-6
2.1.3 Dumping and Placement.....	2-6
2.1.4 Slag and Stock Piles.....	2-8
2.1.5 Slag Crushing, Screening and Conveying	2-8
2.1.6 Inclement Weather	2-15
3.0 AIR QUALITY MONITORING	3-1
3.1 OFF-SITE MONITORING.....	3-1
3.1.1 Air Quality Impacts from Off-Site Sources	3-2
3.2 ON-SITE AIR QUALITY MONITORING.....	3-2
3.2.1 Historical Ambient Monitoring Data.....	3-3
3.2.2 Current Ambient Monitoring	3-9
3.2.3 Soil and Waste Analyses.....	3-10
3.2.4 Determination of Particulate Trigger Levels	3-12
3.2.5 Identify Haz. Airborne Concentrations for Each Significant COC	3-12
3.2.6 Calculate Maximum COC-to-Particulate Ratios for Each COC.....	3-15
3.2.7 Calculate PM ₁₀ and TSP Trigger Levels.....	3-16
3.3 AIR QUALITY OVERSIGHT	3-18
3.4 RATIONALE FOR USE OF TSP MEASUREMENTS.....	3-19
3.5 DESIGN AND IMPLEMENT REAL-TIME MONITORING NETWORK.....	3-20
3.5.1 Real Time Particulate Monitoring	3-20
3.5.2 Real Time Meteorological Monitoring	3-24
3.5.3 Networking and Data Accessibility of the Monitoring System	3-24

3.5.4 Real Time Alarm When Trigger Levels Are Exceeded.....	3-24
3.6 RATIONALE FOR USE OF MET ONE E-SAMPLERS	3-25
3.7 REAL-TIME MONITORING SCHEDULE	3-28
3.8 QUALITY ASSURANCE	3-28
3.9 DATA REPORTING	3-29
4.0 REFERENCES	4-1

LIST OF TABLES

TABLE 2.1.	TACKIFIER USAGE.....	2-5
TABLE 2.2.	RELATIVE EMISSION RATE RATIOS OF CRUSHING AND SCREENING EQUIPMENT	2-9
TABLE 2.3.	RING SIZE, NUMBER OF NOZZLES, AND WATER USAGE	2-11
TABLE 3.1.	EMF AIR MONITORING PROGRAM MATRIX (1993 – 1994).....	3-7
TABLE 3.2.	EPA COC SCREENING LEVELS (HISTORICAL)	3-7
TABLE 3.3.	METALS AND RADIONUCLIDES ANALYZED FROM TSP AND PM ₁₀ FILTERS (1993 – 1994).....	3-8
TABLE 3.4.	EPA METALS / INORGANICS SCREENING LEVELS (CURRENT).....	3-9
TABLE 3.5.	SUMMARY OF SOIL AND WASTE MATERIAL ANALYSES	3-10
TABLE 3.6.	COC SCREENING LEVELS USED FOR TRIGGER LEVEL ANALYSIS	3-14
TABLE 3.7.	SUMMARY OF COC-TO-PARTICULATE RATIOS	3-16
TABLE 3.8.	CALCULATED PARTICULATE TRIGGER LEVELS FOR COCS	3-18
TABLE 3.9.	RADIONUCLIDE CONCENTRATIONS CORRESPONDING TO TSP TRIGGER LEVEL OF 152 µG/M ³	3-18

LIST OF FIGURES

FIGURE 2-1.	TRUCK CLEANING/DECONTAMINATION LOCATIONS.....	2-7
FIGURE 3-1.	FMC LOCATION AND BOUNDARY	3-5
FIGURE 3-2.	2013 WINDROSE FROM NATIONAL WEATHER SERVICE STATIONS: POCATELLO, IDAHO.....	3-22

FIGURE 3-3. PLACEMENT OF FIXED AIR SAMPLERS	3-23
FIGURE 3-4. PHOTOS OF MET ONE E-SAMPLER	3-25

APPENDICES

APPENDIX A - INFORMATION ON DUST CONTROL TACKIFIERS

APPENDIX B - PERMIT TO CONSTRUCT – PORTABLE ROCK CRUSHING PLANT

FMC OU

DUST CONTROL AND AIR MONITORING PLAN

Eastern Michaud Flats Site

Power County, ID

1.0 REGULATORY REQUIREMENTS

This *Dust Control and Air Monitoring Plan* has been prepared on behalf of FMC Corporation (FMC) and presents the procedures that will be used to prevent, monitor, and respond to dust generation during soil remedial action activities at the FMC Operable Unit (FMC OU) of the Eastern Michaud Flats (EMF) Superfund Site (Site). The FMC OU is located in Power County in Idaho, approximately 2.5 miles northwest of Pocatello. The EMF Site includes two adjacent production facilities, the former FMC Corporation elemental phosphorus (P4) processing plant that ceased operation in 2001 and a phosphate fertilizer processing facility currently operated by the J.R. Simplot Company. The EMF Site is shown on Figure 3-1 and encompasses both the FMC and Simplot plants and surrounding areas (Off-Plant OU) affected by releases from these facilities.

This *Dust Control and Air Monitoring Plan* is one of many work elements that have been developed and implemented pursuant to the remedial actions set forth in the Interim Amendment to the Record of Decision (IRODA) for the EMF Superfund Site FMC Operable Unit (IRODA; Environmental Protection Agency [EPA], 2012) and a Remedial Design/Remedial Action (RD/RA) Unilateral Administrative Order (UAO, EPA, 2013a) issued by EPA on June 10, 2013 which became effective on June 20, 2013. This *Dust Control and Air Monitoring Plan* has been prepared for use during the implementation of the remedial construction components (initial site grading and cover construction) of the soil remedy. The selected soil remedy includes placement of soil covers (“capping”) over fill materials and soil mixed with fill materials at the FMC OU, removal and treatment of residual wastes in specified storm water piping and removal of surficial soil at Remediation Area (RA) J, and requires long-term monitoring and land use controls. A more detailed

description of the selected remedy for the FMC OU is presented in Section 2.4.2 of the *Final Remedial Design Work Plan* (MWH, 2013).

In addition, as described in the Federal Air Rule for Indian Reservations in Idaho, Oregon, and Washington set forth at 40 C.F.R. Part 49 (FARR, 2005), this *Dust Control and Air Monitoring Plan* is intended to supplement the FARR Plan required for the FMC site during the period of remedial construction activities planned for 2014-2015. The FARR rules require the owner or operator of any source of fugitive particulate matter emissions located on Indian lands to take reasonable precautions to prevent fugitive particulate matter emissions and to maintain and operate the source to minimize these emissions. Facilities subject to the FARR rules are required to have a written plan describing the reasonable precautions that will be taken to prevent fugitive particulate matter emissions, including appropriate monitoring and recordkeeping, and then to implement that plan.

2.0 DUST SUPPRESSION MEASURES



2.1 DUST SUPPRESSION

Dust generation is a primary concern during site earthwork, which includes excavation, hauling, screening (and potentially crushing), and placement of fill materials (e.g., slag) as part of the site-wide grading to achieve the designed sub-grade elevation and soil during placement of the soil covers (caps). During this work, the Site is to be maintained to EPA-directed standards. The EPA-directed goal at the FMC Pocatello site during the soil remedy construction is “No Visible Emissions.” Therefore, dust control measures will be taken proactively to mitigate the potential sources of the dust as described in this Plan. Generally, the dust control measures include:

1. Watering to moisten large areas that will be disturbed by equipment such as graders and scrapers.
2. Water sprays at point of soil excavation or deposit by equipment such as excavators or dump trucks.
3. Watering of unpaved haul roads and reduced vehicle speeds.
4. Spraying of exposed non-slag waste soils with water prior to relatively short periods of inactivity and with tackifier prior to extended periods of inactivity.

If dust is observed during remedial activity, these measures will immediately be increased in frequency and/or intensity to mitigate dust at the source areas. In addition, these measures will be re-evaluated if the actionable trigger levels established in Section 3 are exceeded based on onsite real time monitoring or if visual observation suggests that dust control is not effective. Operator logs will be used to record water applications. The operator logs will be maintained to indicate how many truckloads are used for dust suppression and when water/tackifier is applied.

Based upon need and effectiveness, the general, prioritized strategy for dust control will be:

1. Application of water using water trucks;
2. Application of water using stationary sprays;
3. Application of tackifiers; and
4. Localized control, e.g., application of small water sprays on conveyor transfer points, screening/crushing equipment.

Further discussion of specific dust control measures are provided in the following subsections.

2.1.1 Excavation and Grading

A significant area of the site is covered with slag, which exhibits cementation properties that naturally control dust when it is left exposed and undisturbed. Even when disturbed by excavation or grading, because slag is a coarse, dense, vitrified material it produces little dust. Historically, there has been no need for dust control on the undisturbed slag surfaces of the site. However, water trucks and/or water sprays will be available and ready for dust control, if needed, whenever earthwork is occurring. Significant excavation is planned only in Remedial Areas RA-F, RA-G, RA-J, and in the Western Undeveloped Area (the source of the capping soil), but grading will occur in all remedial areas. In addition to using water trucks to control dust in these areas, stationary water spraying systems, e.g., an irrigation sprinkler, will be ready for use if needed.

Typically, a water truck will be used to apply water for dust control on roadways, stockpiles, and areas of active excavation or placement of site materials. However, stationary water

spray systems may be applied in areas where it is impractical to use a water truck and/or stationary water sprays are more effective. While stationary water sprays may be used at any location on the site, examples of where stationary spray systems may be used are:

- Areas where access by a water truck is limited or unsafe, such as the surface or sides of the slag pile;
- Large surface areas of disturbance such as RA-J, RA-G, or the Western Undeveloped Area during and after excavation; and
- Areas where soil excavation/placement equipment traffic is high such that use of a stationary spray system is safer than using mobile water trucks.



The stationary spray systems will typically consist of irrigation piping (or other comparable piping system) connecting the FMC production wells on the site to one or more stationary irrigation spray nozzles. The pumps at the production wells will typically supply the volume and pressure needed. However, some instances may require placement of portable tanks and pumps which will be supplied by the water trucks filled from the FMC production wells, e.g., if stationary water sprays are deemed necessary during and after excavation of RA-J. There are no plans to use any off-site source of water to be used for dust control.

A tackifier will be applied as necessary to control dust if an area is to be left exposed and undisturbed for an extended period of time (e.g., seven days or more) and which use of a water truck is deemed impractical or less efficient. FMC and site contractors have successfully used tackifiers for dust control at the Pocatello and other remediation sites. Although other tackifiers may be found and used which are more effective, the types of tackifiers that are planned for use, concentrations and application rates are provided in Table 2.1.

At the end of each workday, exposed soils in excavation areas that are not composed primarily of slag will be inspected to determine whether they are sufficiently moist to leave overnight, i.e., if the surface appears thoroughly wetted. If not, additional water will be applied until the surface is thoroughly wetted while avoiding any pooling on or runoff from the surface. If disturbed soils are to be left in work areas over an extended period of time, a sprinkler system or other means of dust control such as tackifier will be used as deemed necessary to suppress dust. For example, an area of disturbed soil will be wetted with the water truck as needed to control dust. If the area is to be inactive for seven (7) days or more (i.e., no active disturbance of the area soil), an evaluation will be made whether to continue use of the water truck for dust control or if application of a sprinkler system or tackifier would be more efficient. In cases where the disturbed soil is stable and is not creating visible dust and air monitoring indicates that total suspended particulate loading in the air is below trigger levels as discussed in Section 3.0, then no further dust control measures will be used until such time the area becomes actively disturbed.



TABLE 2.1. TACKIFIER USAGE

Note that Manufacturer Specification Sheets, Product Descriptions, and Safety Data Sheets for each of these tackifiers are provided in Appendix A.

Tackifier Name	Primary Active Ingredient	Primary Usage	Active Ingredient Concentration at Application	Application Rate ¹
Dust Guard Liquid®	Magnesium Chloride	Dust control on unpaved roads, stockpiles, and disturbed soils.	30%	1/2 gal/yd ² , split in two 1/4 gal/yd ² applications.
Road Oyl®	Pine Resin and Pitch Emulsion	Dust control on unpaved roads.	5 to 10%	Wet the road surface, approximately 1/2 gal/yd ² .
Soiltac/Gorilla Snot®	Vinyl Co-Polymer	Dust control on unpaved roads, stockpiles, and disturbed soils.	20 to 60%	0.01 gal/yd ² for disturbed soils. 0.15 gal/yd ² for unpaved roads.

¹ Application rates may vary significantly based upon site conditions, weather, traffic use, and steepness of grade.

2.1.2 Haul Roads

Unpaved haul roads will be treated as necessary to control dust with magnesium chloride (per the application rates provided in Table 2-1), which has worked well at the site, or an equivalent tackifier, and water trucks will be used to apply additional dust control water spray to unpaved haul roads prior to their use. Additional magnesium chloride will be applied on an as-needed basis to control dust on haul roads. In addition, vehicle speeds will be kept below 20 mph and as low as necessary to prevent dust. Signs will be posted on each major segment of designated haul roads to remind drivers of the “No Dust” rule.

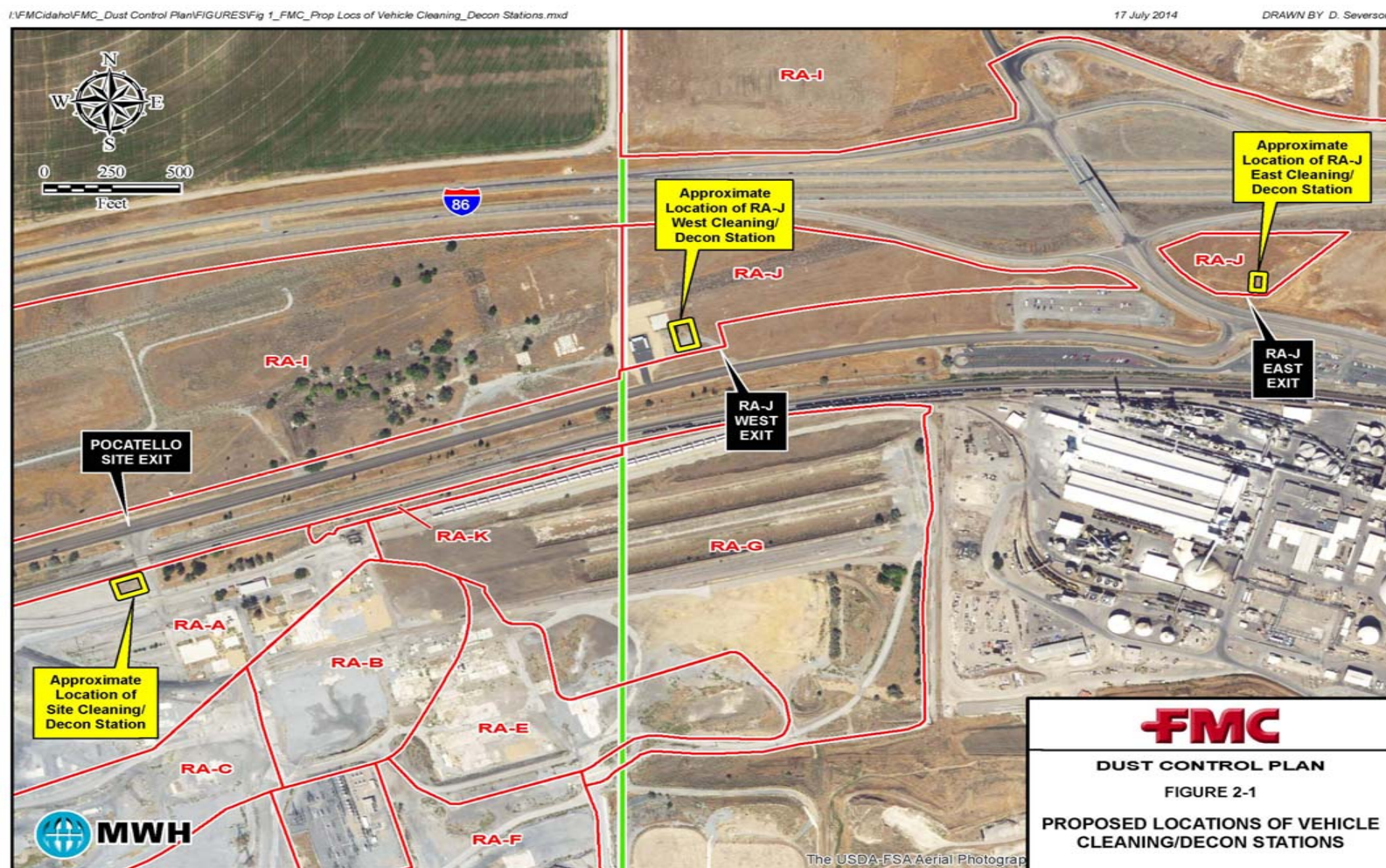
Paved roadways within the site will be maintained using a regenerative or vacuum type street sweeper that will be available as needed for cleaning these roadways. Hauling on public paved roads is planned only for limited excavation associated with RA-J and at the end of the project for the project close out. Trucks leaving the site will be swept or mechanically cleaned at identified decontamination sites prior to entering public roadways. Cleaning will be conducted to prevent tracking dust from the site. These cleaning/decontamination station locations are shown on Figure 2-1. While these stations will be located near the entrance/exits, the exact location may not be determined until site mobilization and will likely have to be moved during the remedial actions.

Loading of trucks will be carefully monitored and water spray may be applied as needed to knock down dust generated during loading. If the haul load includes fine-grained soil, the contents of the truck will be wetted prior to haul or the load will be covered if deemed necessary to control dust.

2.1.3 Dumping and Placement

Unloading of trucks will be carefully monitored and water spray will be applied as needed to knock down dust generated during unloading or dumping. Truck drivers will be trained on the need for care during unloading of trucks in order to prevent dust generation.

FIGURE 2-1. CLEANING/DECON STATION LOCATIONS



2.1.4 Slag and Stock Piles

Movement or handling of slag at the slag pile (RA-F) will be nearly continuous during operating hours for the Site-wide Grading phase of site remedial activities. Because of the slag pile elevation and nearly continual disturbance during construction hours, activities at the slag pile may pose a greater dust hazard than the rest of the slag-covered areas on site. The movement of slag on the slag pile will be managed in order to prevent fugitive dust. Dust from the slag pile will be controlled through use of water trucks, water sprays, and/or manned water hoses.

If deemed necessary, dust from stockpiles of other soils will be controlled through the use of water sprays when the stockpile is in use and tackifier when it is left undisturbed for an extended period of time.

2.1.5 Slag Crushing, Screening, and Conveying

Mineral crushing and screening operations can be major sources of airborne dust due to the inherent nature of size reduction and segregation processes. Control of dust generated by these operations can be achieved with proper analysis of the sources, identification of appropriate control technologies, and consistent application and maintenance of selected controls (NIOSH, 2012). Therefore, prevention of dust generation will be a primary focus during the slag crushing, screening, and conveying operation and dust control measures will be taken proactively to minimize the potential generation of dust. While Section 121(e)(1) of CERCLA provides that no Federal, State, or local permit is required for any removal or remedial action taken on-site, the slag crushing and screening subcontractor has obtained a federally-enforceable air permit for the portable rock crushing equipment to be used for slag crushing, screening, and conveying operations. The requirements of this permit (included in Appendix B of this Plan) in addition to all requirements of this Plan will be met during site operations.

Wet dust control systems can be very effective and are relatively low cost to install and operate (NIOSH, 2012). As shown in Table 2.2 below (EPA, 2003), wet processes generate significantly less dust than dry processes. Due to characteristics of the slag and the method of crushing and screening, wet dust control is possible for this application and should be very

effective in controlling dust. However, because these operations are in a northern climate, freeze protection is necessary during cold weather (see Section 2.1.6).

TABLE 2.2. RELATIVE EMISSION RATE RATIOS OF CRUSHING AND SCREENING EQUIPMENT

Equipment	Relative Emission Rate Ratio
Primary crusher	1
Tertiary crusher (dry)	51
Tertiary crusher (wet)	2
Screen (dry)	214
Screen (wet)	12

The use of water to control dust may be classified into prevention applications and suppression applications. Prevention is the application of water to prevent dust from becoming airborne. Suppression is the use of water to wet dust particles which have already become airborne, increasing their mass and causing them to settle more rapidly. In general, prevention is more effective than suppression (NIOSH 2003; USBM 1978). Consistent with this Plan, reasonable precautions involving both prevention and suppression applications, such as focused sprays or covers, will be used to prevent dust generation during the crushing, screening, conveying, and stockpiling of slag so as to achieve the site goal of no visible emissions.

Wet dust control measures to be used by the remedial construction contractor for the prevention of dust during slag crushing and screening operations at the Site include:

1. Watering the area (within RA-F and elsewhere as needed) with water trucks associated with the slag crushing and screening operation that will be disturbed by equipment such as bull dozers, excavators, haul trucks and graders.
2. Pre-wetting the feed material will occur. It is anticipated that this will be the most effective and primary dust control method for the crushing and screening material. One or more 1,000 gallon portable tanks with pumps (110 irrigation pumps that pump approximately 45-50 psi) and spray bar manifolds that are mounted to the portable trailer will be used. Portable tank(s) will be filled by water trucks.
3. Water trucks will be used at points of soil excavation or deposition by equipment such as excavators or dump trucks.



If wetted material will be subjected to further size reduction, such as in crushing operations, effective prevention requires application of additional water to the dry—and larger—surface area of the material exposed by the size reduction process. Wet dust control measures for the suppression of dust that will be used include:

1. Fixed water sprays associated with the crusher and screener (spray bars) will be used. Spray bars can be mounted at various locations on the process equipment and spray or misting nozzles will be adjusted as needed. The dust suppressant rings will be mounted on the stacking conveyor, cone crusher, and jaw crusher discharge belts as needed. Water hoses can connect directly to NPT male threads on the ring, and be supplied by one or more 1,000 gallon portable tank with pumps. Portable tanks will be filled by water trucks.
2. Misting nozzles will provide droplet sizes of 50-200 microns. Typical ring sizes including the estimated number of nozzles and estimated flow rates are included in Table 2.3 below. The photograph below demonstrates their use.

TABLE 2.3. RING SIZE, NUMBER OF NOZZLES, AND WATER USAGE

Ring Size	Nozzles	Water Usage
17"	30	3.25 GPM (12.30 LPM)
23.5"	18	11.34 GPM (42.93 LPM)
26"	30	18.90 GPM (71.54 LPM)
30"	30	18.90 GPM (71.54 LPM)
42"	30	18.90 GPM (71.54 LPM)
48"	30	18.90 GPM (71.54 LPM)
54"	30	18.90 GPM (71.54 LPM)
72"	38	23.94 GPM (90.62 LPM)
100"	82	52.95 GPM (200.44 LPM)



If dust is observed during remedial activity, implementation and/or intensification (i.e. increase in frequency or intensity) of appropriate prevention or suppression applications will occur to minimize dust at the source areas. In addition, these measures will be re-evaluated if the action levels established in this Plan are exceeded based on onsite real time monitoring or if visible dust emissions are observed.

2.1.5.1 Slag Handling

A significant area of the site is covered with slag, which exhibits cementitious properties that naturally control dust when it is left exposed and undisturbed. Even when disturbed by

excavation or handling, because slag is a coarse, dense, vitrified material it produces little dust. Historically, there has been no need for dust control on the undisturbed slag surfaces of the site. However, water trucks and/or water sprays will be available and ready for dust control, if needed, whenever crushing and screening is occurring. Slag that is scheduled for crushing will be sprayed with water prior to crushing if necessary. In addition to using water trucks to control dust in these areas, stationary spraying systems (spray bars) will be used with the crusher and screener during operation, if necessary.

2.1.5.2 Transporting Screened Slag

Unpaved areas adjacent to the crushing and screening operation will be treated as necessary with water spray to control dust. Water trucks will be used to apply dust control spray to unpaved areas adjacent to the crushing and screening operation so the screened slag can be transported to its final destination without creating visible dust. In addition, vehicle speeds will be kept as low as necessary in the area adjacent to the crushing and screening operation to control dust.

Loading of trucks will be carefully monitored and water spray may be applied as needed to knock down dust generated during loading. If the haul load includes fine-grained materials, the contents of the truck will be wetted prior to haul if deemed necessary to control dust.

2.1.5.3 Dumping and Placement

Unloading of trucks will be carefully monitored and water spray will be applied as needed to knock down dust generated during unloading or dumping of unprocessed slag at the slag crushing and screening area. Water trucks will be used to spray water during unloading or dumping of the processed slag if necessary. Truck drivers will be trained on the need for care during unloading of trucks in order to minimize dust generation.

2.1.5.4 Slag Crushing, Screening, and Conveying Equipment

The following equipment is anticipated to be used in the crushing and screening operation by the slag crushing/screening subcontractor:

- Caterpillar 980H 7.5 cy Wheel Loader
- Caterpillar 1,000 kW Generator Set
- Cedarrapids 3042 Jaw Crusher
- Variable Speed Grizzly Feeder
- Cedarrapids MVP 450 Cone Crusher
- Cedarrapids 54" RCII Cone Crusher
- Cedarrapids 8 x 20 Triple Deck Screen
- KPI-JCI 145' Telescoping Stacker
- 40' Control/Electrical Van

The remedial construction contractor will employ the following equipment to support the slag crushing and screening subcontractor during the crushing and screening operation:

- Caterpillar 980 Wheel Loader
- Caterpillar D8 Dozer
- Volvo and/or Caterpillar Off Road Articulating Dump Trucks (40 ton capacity)
- Water trucks
- Portable tanks

2.1.5.5 Slag Screening and Conveying

Reasonable precautions such as focused sprays, pre-wetting of slag to be crushed, and/or spray bars attached to the crushing and screening equipment will be used to minimize dust generation during the handling, screening, conveying, and stockpiling of slag so as to achieve the site goal of no visible emissions.

The anticipated rate of the slag crushing and screening operation is 275 cubic yards per hour (one crushing and screening operation). At this rate it will take approximately 1,662 hours to crush and screen the estimated 460,000 cubic yards of slag necessary for cap construction. These volumes are estimates and will be adjusted based upon the final design.

2.1.5.6 Slag Crushing

Methods to obtain appropriately sized slag for the capillary break layer of the ET caps will be determined during the test run by the remedial construction contractor and the slag crushing/screening subcontractor. Generally, the previously mentioned equipment (see Section 2.1.5.4) will be employed but additional equipment may be necessary after the test run has been evaluated. The remedial construction contractor plans to implement a screening operation(s) that will be setup in or near RA-F in an approximate 200' x 100' flat and stable work area to allow for the plant equipment layout. This is shown approximately on Drawing 5 of the "FMC OU Remedial Design 30% Design Submittal March 2014" included with this plan. Initially, the raw material will be loaded into an impact crusher with a horizontal screen plant that will produce the 1" minus material. The impact crusher will be equipped with an internal water sprayer for dust suppression. Once material is processed it will be stockpiled and placed by remedial construction contractor equipment and personnel. The impact crusher discharge will also be equipped with a water spray bar manifold for dust suppression as shown in the photograph below. Water will be made available to handle dust suppression activities at the crushing location.



2.1.5.7 Slag Crushing, Screening, and Conveying Monitoring

The following monitoring, consistent with the air permit for the portable rock crushing plant, shall be performed:

- Monitor and record the hours of operation of the slag crushing, screening, and/or conveying equipment on a monthly basis.
- Monitor and record the total throughput of slag to the crushing facility in tons per day (T/day) and tons per year (T/yr).
- Monitor and record in a log, during operation, the periodic method(s) used to reasonably control fugitive emissions from the slag crushing, screening, and conveying operation. The log shall include the type of control used (e.g., water, chemical dust suppressants, spray bars, etc.) as well as the circumstances under which no controls are used.
- Conduct a visual determination of emissions at the property boundary in accordance with IDAPA 58.01.01.157 and General Provision F of the air permit.

In addition to this monitoring, the air monitoring provisions outlined in Section 3.0 of this Plan will also be met. Figure 3-3 shows the proposed location of the slag crushing/screening equipment and the proposed location of one of the floating E-samplers (as described in Section 3.5.1) which will be positioned and operated downwind during periods when the slag crushing/screening equipment is in operation.

2.1.5.8 Slag Crushing, Screening, and Conveying Training

Once the slag crushing, screening, and conveying equipment is placed and the system is operational, training for all slag screening and conveying operators will be provided. This training will take place initially during subcontractor mobilization at the site and will be re-enforced during daily, morning tailgate safety meetings.

2.1.6 Inclement Weather

Remedial activities at the site are planned to occur from February 15th to December 15th each year and will be suspended during the coldest winter period. There will be a subcontractor on site during these inactive periods to conduct a daily visual inspection for fugitive dust

generation, however, site activities associated with the remedial activities in the winter months will be very limited and dust issues are not anticipated. Freezing temperatures may still be encountered during active periods (i.e, October, November, December, February, March and/or April). Because of freezing temperatures, typical dust control may not be practical in the in colder months. Application of water could actually create unsafe conditions. Therefore, application of water for dust control may need to be suspended when the average daily temperatures fall below freezing and application of water becomes impracticable. Generally, water application for dust control during colder months will be performed unless one or more of the following conditions exist:

- Water trucks cannot be filled due to freezing of the water lines filling the trucks;
- Water trucks cannot apply the water due to freezing of the spray nozzles;
- Water being applied to the ground surface freezes upon contact creating a hazardous condition for equipment or site workers; and/or
- Water piping feeding stationary spray equipment or the stationary spray equipment freezes.

Experience at the site has shown that dusting is generally not a problem during sub-freezing temperatures. However, if water application is not possible for one or more of the reasons listed above and remedial activities create visible dust or air monitoring indicates total suspended particulate loading in the air to be above trigger levels as discussed in Section 3.0, then the remedial activities will have to be suspended until such time that the dust can be controlled.

There may be other times when water application for dust control is suspended. During periods of rain when the ground is saturated, application of additional water could create muddy conditions that are not compatible with the work that is taking place. Therefore, water application for dust control may be suspended when the ground is saturated or other conditions exist such that remediation activities are not creating visible dust and air monitoring indicates that total suspended particulate loading in the air is below trigger levels.

3.0 AIR QUALITY MONITORING

Air monitoring will be employed during remedial activities and will be conducted by a Site Air Quality Control (SAQC) Contractor. As described in this Section 3.0, the existing air monitoring at the off-site location will be augmented by a system of real-time air monitors around the site, including downwind of active construction. The approximate locations of these real-time monitoring sites are described in this Section and exact locations will be developed for each phase or geographic area of RA, once the construction contractor is selected and the sequence of work is established.

3.1 OFF-SITE MONITORING

The existing ambient air quality monitoring system (e.g., IDEQ air monitoring station at the Pocatello Water Pollution Control [“STP”]), which is located near Site 1 on Figure 3-1, will continue to be used for monitoring ambient air quality in the prevailing downwind direction from the FMC and Simplot OUs. Deployment of additional off-site monitoring is not feasible as a means of monitoring the effectiveness of FMC’s dust control plan due to the confounding effects of proximate sources of dust emissions that cause air quality concerns. The on-site monitoring program discussed in the balance of this section is sufficiently robust to obviate the need for additional and non-determinative off-site monitoring.



3.1.1 Air Quality Impacts from Off-Site Sources

The FMC OU is bounded on the east by Simplot and on the north of the main plant site by an active railroad line. FMC's Northern Properties, which include RA-J are bounded by an interstate highway and active agricultural fields. Off-site sources of particulate emissions have previously and have the future potential to impact Site air quality. Emissions from Simplot's stacks and dust from their gypsum stack, particularly during the current significant remedial construction activities on the gypsum stack to support their remedial action to install liners on the stack, place particulate in the air that may be seen by on-site (as well as off-site) monitors. Similarly, emissions from trains and dust from the railroad line, highways and agricultural have the potential to affect Site air quality within the FMC property south of Highway 30 and RA-J. The Site Air Quality Contractor (SAQC) will need to be prepared to quickly document instances when they determine that off-site sources are triggering the on-site air monitors.

3.2 ON-SITE AIR QUALITY MONITORING

There are several reasons for monitoring the ambient air quality on the site during remediation activities. These include:

1. Protecting the health and welfare of on-site workers.
2. Protecting the health and welfare of the surrounding population.
3. Minimizing the off-site transport of airborne contaminants.
4. Evaluating the effectiveness of the on-site dust control procedures.

The purpose of this plan is to define on-site air quality monitoring to accomplish these four objectives. In this plan, a greater emphasis is being placed on item 4, evaluating the effectiveness of the on-site dust control procedures, for the reason that if the on-site dust control procedures are adequate, items 1 through 3 will be effectively addressed. This on-site air quality monitoring program has been developed using the following process.

Existing data (including both historical air monitoring data and site soil and fill material analyses) was evaluated to determine potential maximum concentrations of contaminants of

concern (COCs) in airborne particulate matter. Using these maximum concentrations of individual COCs, threshold concentrations of airborne particulates that would correspond to COC levels of potential concern were calculated to develop action level triggers for onsite particulate monitoring. Section 3.2.7 of this Plan details these calculations. To provide an additional margin of safety, each initial trigger level calculation was subsequently divided by 10; the adjusted PM₁₀ and TSP trigger levels derived are 105 µg/m³ and 152 µg/m³ which provide assurance that the COC constituents within that dust are protective of human health.

In order to ensure that dust control measures are effective in maintaining air borne dust below these levels, a network of real-time monitors to continuously monitor hourly ambient concentrations of particulates will be installed.

An automated alarming system to alert FMC representatives to potentially hazardous ambient dust and/or COC concentrations will be developed to enable FMC to take appropriate actions.

3.2.1 Historical Ambient Monitoring Data

Extensive air quality monitoring has been performed in the area surrounding the FMC and Simplot facilities pursuant to the EMF Superfund Site Remedial Investigation/Feasibility Study (RI/FS). Ambient air quality monitoring continues today under the Clean Air Act (CAA). That CAA monitoring focuses on airborne particulates and is conducted to evaluate compliance with National Ambient Air Quality Standards (NAAQS) for particulates. A review of summarized historical data indicates this CAA monitoring was focused on total particulates (whether TSP or PM₁₀), and not on their composition.

One objective of this monitoring program is to ensure that dust control measures implemented during the remedial action are protective of the surrounding population. Beyond characterizing general ambient conditions, airborne particulate data alone is of little value to this effort to define particulate trigger levels that are indicative of hazardous COC concentrations. However, an intensive sampling campaign was conducted from October 1993 through October 1994 around the FMC and Simplot facilities, when over 3,600 air

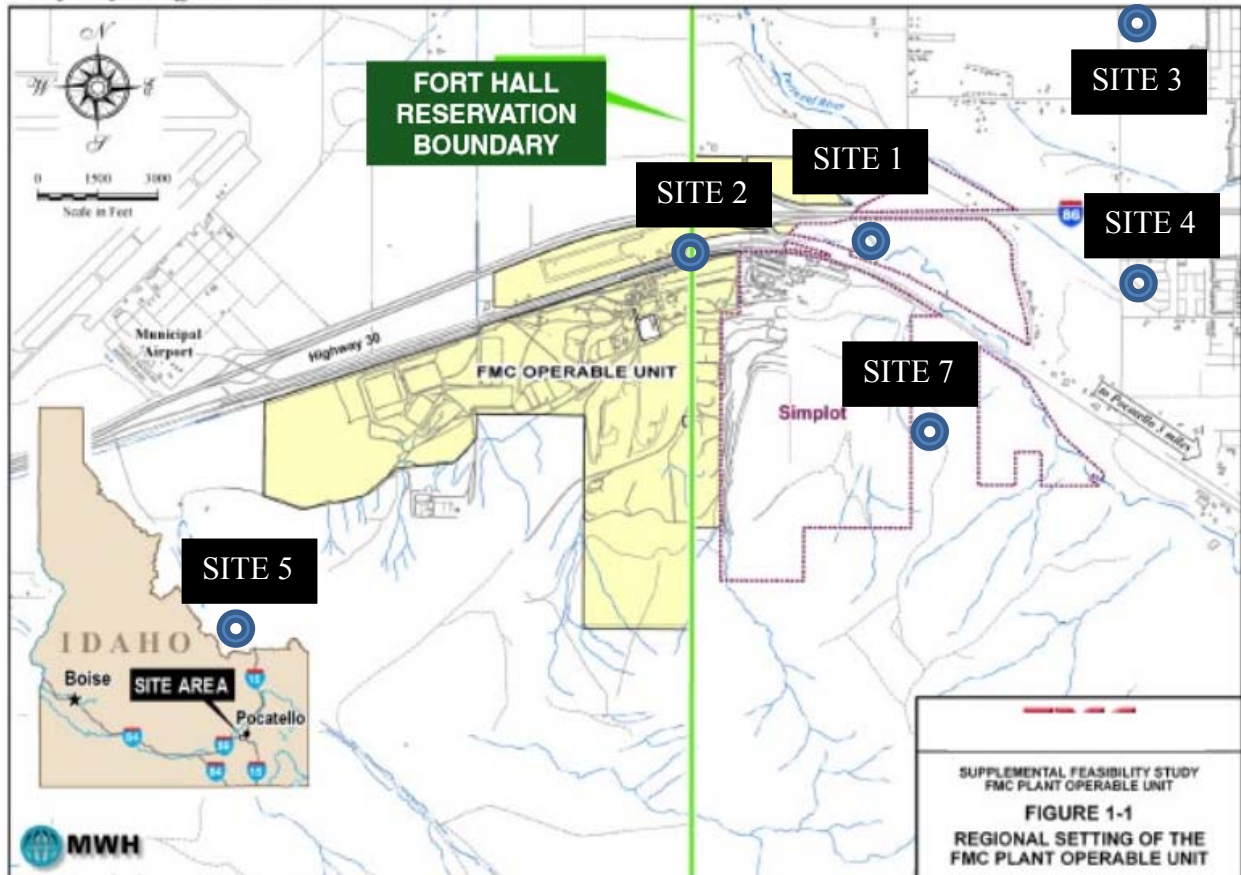
quality samples were collected by FMC and Simplot as part of the EMF RI/FS. That sampling included numerous analyses of exposed filters for specific COCs. The purpose of that study was to characterize impacts on ambient air quality by air emissions from the two facilities and to obtain data to evaluate an atmospheric dispersion model of emissions from the facilities. Results are documented in the *Remedial Investigation for the Eastern Michaud Flats Site: Part III, Air Quality Characterization / Air Monitoring Report* (Bechtel, 1995). That report included statistical analyses relating ambient particulate levels to airborne COC concentrations, and will be a primary resource for establishing ambient particulate concentration trigger levels. Figure 3-1 depicts six historical monitoring locations near the FMC site, while Table 3-1 summarizes the types of monitoring performed at each site. Data also were collected at an upwind site designated as Site 6, and located approximately 13 miles to the west-southwest of the FMC site.

Types of sampling included:

- Meteorological monitoring at Sites 1 and 7, including wind speed and direction, temperature, humidity, and wind direction standard deviation.
- Total suspended particulate (TSP) high-volume monitoring at all seven sites, consisting of 24-hour samples collected on quartz fiber filters. Initially, the filters were analyzed for total phosphorus, particulate fluorides and thirteen metals. After February 5, 1994, analysis for seven of the thirteen metals was discontinued because of results that were consistently non-detectable and/or well below EPA-prescribed residential air screening levels in effect at that time (summarized in Table 3-2).
- Inhalable particulate (PM₁₀) high-volume monitoring at all seven sites, also consisting of 24-hour samples collected on quartz fiber filters. Initially those filters also were analyzed for thirteen metals, plus seven radionuclides and phosphorus. After February 5, 1994, analysis for seven metals and two radionuclides was discontinued because of consistently non-detectable and/or very low results.

FIGURE 3-1. FMC LOCATION AND BOUNDARY WITH HISTORICAL MONITORING SITES

Taken from EPA Fact Sheet, “Plan to address pollution at the former FMC phosphorus processing plant,” October, 2012.



- Low-volume (Lo-Vol) particulate monitoring at Sites 3, 4, 5 and 6, consisting of 30-day samples collected on smaller filters. Those samples were analyzed for 13 metals and seven radionuclides for the duration of the monitoring program.
- Sampling for crystalline silica and fluorides at Sites 1, 2 6, and 7, discontinued after April 1994 because of consistently non-detectable or very low analytical results.

Table 3-3 summarizes the metals and radionuclides that were analyzed initially from particulate samples, and those that were subsequently discontinued as discussed above. Note that the fact that a given contaminant was eliminated from further consideration in 1994 does not mean it was automatically excluded from the current analysis. Each metal or inorganic

occurring at levels at or above the **current** EPA residential air screening levels (EPA, 2013b) was considered for the analysis presented herein. Although a screening level for elemental phosphorus was included in the historical data, EPA (2013b) currently lists no screening level for it. Because phosphorus oxidizes so quickly when in contact with air, it is not likely to be a contaminant of concern for this remediation effort.

Section 3.2 discusses how the results of this sampling campaign will be used to establish ambient particulate trigger levels, based on the COC fractions in the particulate samples. While recognizing that the concentration data are approximately 20 years old, FMC believes their use is scientifically sound and appropriate for the “trigger level” analysis presented in Section 3.3 because:

- Those data were collected when both FMC and Simplot were in full operation, so overall emissions were higher than at present – and those data may in fact **overstate** current COC concentrations in airborne particulates because they include process emission sources as well as fugitive dust sources;
- The remediation will involve excavation of historical process materials that were the same materials being handled when the 1993-1994 monitoring was conducted. It is unlikely that COC concentrations in that material have increased over the past 20 years; if anything, leaching of COCs from precipitation, snowmelt etc., may have decreased their concentrations in the near-surface material;
- There is no practical alternative to using those data, which required an intensive yearlong sampling campaign to collect. The historical sampling program was sufficiently robust in coverage and duration to reliably capture worst-case conditions. The alternative is to begin sampling anew with the objective of precisely defining current conditions. However, a short-term effort would risk not capturing worst-case conditions and thereby calculating insufficiently protective trigger levels. Alternatively, such an effort could be conducted during the remediation, but would delay development of trigger levels for a prolonged period of time during construction and be further confounded with interference from off-site sources.

TABLE 3.1. EMF AIR MONITORING PROGRAM MATRIX (1993 – 1994)

Parameter	Sites						
	1	2	3	4	5	6	7
Meteorological	X						X
TSP	X	X	X	X	X	X	X
PM ₁₀	X	X	X	X	X	X	X
Lo-Vol			X	X	X	X	
Crystalline Silica	X	X				X	X
Gaseous and Particulate Fluoride	X	X				X	X

TABLE 3.2. EPA COC SCREENING LEVELS (HISTORICAL)

Metals ¹		Other Non-Rad Inorganics ¹	
<i>Parameter</i>	<i>Screen Level (µg/m³)</i>	<i>Parameter</i>	<i>Screen Level (µg/m³)</i>
Aluminum	33	Fluorides	8.3
Arsenic	0.00057	Phosphorus	0.3
Barium	0.52	Crystalline Silica	Not specified
Beryllium	0.001	Radioactive Isotopes²	
Cadmium	0.0014	<i>Parameter</i>	<i>Screen Level (pCi/m³)</i>
Total Chromium	0.0002	Lead-210	0.0012
Manganese	0.42	Polonium-210	0.0018
Nickel	0.01	Radium-226	0.0016
Selenium	0.7	Radium-228	0.0069
Thallium	0.3	Thorium-230 & 232	0.0002
Vanadium	0.17	Uranium-234 & 235	0.0002
Zinc	Not specified	Uranium-238	0.0001
¹ Screening levels were originally developed by EPA Region 9, and used by EPA Region 10 for the 1993-1994 sampling program. ² Screening levels used by EPA Region 10 for the 1993-1994 sampling program. Original source not cited in Remedial Investigation document.			

**TABLE 3.3. METALS AND RADIONUCLIDES ANALYZED
FROM TSP AND PM₁₀ FILTERS (1993 – 1994)**

COC Name	COC Symbol	Analyzed from October 1993 to February 5, 1994	Analyzed After February 5, 1994
Metals (from TSP and PM₁₀ samples)¹			
Aluminum ²	Al	X	
Arsenic	As	X	X
Barium	Ba	X	
Beryllium	Be	X	
Cadmium	Cd	X	X
Chromium (total)	Cr	X	X
Manganese ²	Mn	X	
Nickel	Ni	X	X
Selenium	Se	X	
Silver	Ag	X	
Thallium	Tl	X	
Vanadium	V	X	X
Zinc	Zn	X	X
Radionuclides (from PM₁₀ samples only)¹			
Lead-210	Pb-210	X	X
Polonium-210	Po-210	X	X
Radium-226	Ra-226	X	X
Radium-228	Ra-228	X	
Thorium-230	Th-230	X	
Thorium-232	Th-232	X	X
Uranium (total; species derived by assumed composition)	U-234 U-235 U-238	X	X
¹ Lo-vol samples were also analyzed for all metals and radionuclides for the duration of the sampling campaign. However, trigger level analysis was performed using analyses of COCs from TSP and PM ₁₀ filters since they are more representative of maximum short-term (24-hour) concentrations. ² Denotes that the analyte's maximum concentration was below the screening levels used to evaluate the 1993-1994 data, but greater than the EPA RSLs published in November 2013.			

TABLE 3.4. EPA METALS / INORGANICS SCREENING LEVELS (CURRENT)

Metals¹		Metals¹	
<i>Parameter</i>	<i>Screen Level (µg/m³)</i>	<i>Parameter</i>	<i>Screen Level (µg/m³)</i>
Aluminum	0.52	Selenium	2.1
Arsenic	0.00057	Thallium	Not specified
Barium	0.052	Vanadium	0.01
Beryllium	0.001	Zinc	Not specified
Cadmium	0.001 ²	Other Inorganics¹	
Total Chromium	Not specified ³	Fluorides	1.4
Manganese	0.0052	Phosphorus	Not specified ⁴
Nickel	0.0015	Crystalline Silica	0.31
¹ Source: EPA Regional Screening Level Summary Table, EPA Region 9, November 2013. These levels are based on residential air and were used <i>solely</i> to eliminate sampled parameters from further consideration. These levels were not used for trigger level calculations, as explained in Section 3.2.1. ² This value is for cadmium inhaled in water. No level is given for airborne inhalation. ³ A value of 0.000011 is given for chromium VI. However, historical sampling at FMC was for total chromium. ⁴ While EPA used a screening value of 0.3 µg/m ³ for historical sampling at FMC, (EPA, 2013b) shows no value for phosphorus.			

3.2.2 Current Ambient Monitoring

The usefulness of more recent (and current) particulate monitoring data, as shown on Table 3-4, for establishing ambient particulate trigger levels also was investigated, including:

- The Idaho Department of Environmental Quality (IDEQ) real-time PM₁₀ particulate monitor at the corner of Garrett and Gould in the city of Pocatello, approximately 4.5 miles southeast of FMC.
- The Shoshone-Bannock Tribe's Ballard Road site approximately 10 miles to the north of FMC at Fort Hall, Idaho.

During 2013, the Garrett / Gould site showed an average 24-hour PM₁₀ concentration of 21 µg/m³ and the Ballard Road site an average 24-hour PM₁₀ concentration of 23 µg/m³.

Both sites use real-time monitors that measure hourly average particulate readings but not metals concentrations. Furthermore, the monitors do not generate an exposed filter suitable for subsequent metals analysis. Finally, it must be emphasized that the monitors are located considerably farther off-site than historical monitoring sites 1, 2 and 7; even if the desired

data were available, data from those locations would likely *not* be representative of worst-case worker exposure to the COCs.

3.2.3 Soil and Waste Analyses

In addition to the ambient monitoring discussed above, soil and fill samples collected during the remedial investigation at FMC have been analyzed for numerous metals, nonmetals and radionuclides, including most of the COCs discussed in Section 3.1.1. The material types which are expected to be representative of the material that will be disturbed, moved and otherwise could potentially become airborne as dust during remediation are phosphorus ore, slag and native soil. The soil and fill data used for this evaluation are summarized in Table 3-5.

TABLE 3.5. SUMMARY OF SOIL AND WASTE MATERIAL ANALYSES

	Maximum Concentration by Material Type			Overall Maximum	Maximum Cumulative Effect
COC	Background Soil	Phosphorus Ore	Slag		
Metals (mg/kg)					
Aluminum	13,900	12,400	26,900	26,900	NA
Arsenic	10.4	14.6	No Data	14.6	NA
Cadmium	0.72	77.8	103	103	NA
Chromium (total)	13.9	822	290	822	NA
Manganese	710	122	205	710	NA
Nickel	15.5	126	11.9	126	NA
Vanadium	19.6	996	250	996	NA
Zinc	66.5	991	450	991	NA
Other Non-Radioactive Inorganics (mg/kg)					
Fluorides	302	13,200	17,800	17,800	NA
Phosphorus ¹	672	65,900	5,680	65,900	NA
Radioactive Isotopes (pCi/g)					
Lead-210	2.0	31.9	16.7	31.9	33.9
Polonium-210	3.58	25.2	23.7	25.2	28.78
Radium-226	0.95	53.0	40.0	53.0	53.95
Thorium-232	No Data	0.516	0.730	0.730	0.730
Uranium-238	0.88	26.0	30.7	30.7	31.58
¹ There is no OSHA PEL for total phosphorus to directly compare with historical monitoring data. However, OSHA PELs are given for airborne phosphorus compounds including yellow phosphorus, phosphorus pentachloride, phosphorus pentasulfide and phosphorus trichloride. For conservatism, the lowest of those limits (0.1 mg/m ³ or 100 µg/m ³ , for yellow phosphorus) was used for this evaluation.					
Data sources include: EMF Remedial Investigation Report (Bechtel, 1996), Remedial Investigation Update Memo (Bechtel, 2004), SRI Work Plan (MWH, 2007), and Supplemental Remedial Investigation Addendum (MWH, 2008).					

The analytical results presented in Table 3-5 were used to determine the potential fraction of COCs that could be present in airborne dust resulting from the disturbance of soil, ore and slag materials. Those results then are used in Section 3.2 of this plan (along with historical air monitoring data) to calculate airborne particulate concentrations that could indicate unacceptably high concentrations of those COCs. It should be noted that hazardous threshold concentrations for a given COC vary depending upon the route of exposure. For example, the hazardous threshold level for direct contact or ingestion may differ markedly from that associated with inhalation of airborne material. This Air Quality Monitoring Plan addresses only exposure to COCs via inhalation; it is assumed that other exposure routes will be addressed via personnel monitoring, use of appropriate PPE and other measures taken pursuant to the site specific health and safety plans.

3.2.4 Determination of Particulate Trigger Levels

The basic process used to determine particulate trigger levels is summarized below. Details of each step are provided in Sections 3.2.5 through 3.2.7.

1. Identify the significant COCs and an appropriate hazardous ambient concentration threshold for each.
2. For each significant COC, calculate the overall COC-to-particulate ratio at each historical monitoring site (for both PM₁₀ and TSP, as applicable). For non-radioactive substances, this ratio is a dimensionless number represented as [COC]/[PM₁₀] or [COC]/[TSP], as appropriate. It represents the fraction of the airborne dust that consists of the COC in question. For radioactive isotopes, the ratio is represented in the same way, but in units of picocuries per gram. Additional COC-to-particulate ratios were calculated using the soil and waste analyses discussed in Section 3.1.3.
3. For each COC, use the highest ratio obtained among the seven air monitoring sites (and the soils/wastes) for subsequent trigger level determinations; e.g., the highest [COC]/[PM₁₀] ratio for arsenic was obtained at Site 1, so that value was used for the subsequent PM₁₀ trigger value calculation associated with arsenic.
4. For each COC, divide its hazardous concentration threshold by its maximum [COC]/[PM₁₀] and/or [COC]/[TSP] ratio to determine the PM₁₀ and/or TSP trigger levels that indicate potentially hazardous airborne concentrations of that COC. Then apply a safety factor of 10 to each of those results to provide an added margin of safety to both onsite workers and offsite communities.
5. The lowest PM₁₀ and TSP values obtained in Step 4 were defined as the trigger levels.

3.2.5 Identify Hazardous Airborne Concentrations for Each Significant COC

The first step in this process was to identify potentially significant COCs. As noted in Section 3.1.1, the EPA screening levels used to identify contaminants as insignificant in the 1994 RI Document have since been revised. Therefore, any contaminant with monitored concentrations (or activity levels in the case of radionuclides) greater than either the 1994 or 2013 residential screening levels was evaluated as a potentially significant COC.

The second step of this process was to identify a hazardous airborne concentration threshold for each potentially significant COC. Both the original (Table 3-2) and updated (Table 3-4) EPA screening values were based on *residential* air concentrations, and are therefore very conservative – and inappropriate for evaluating *onsite* air quality at industrial locations during remediation activities. If those residential standards were applied to onsite airborne concentrations, remediation activities would not be possible. Because the first objective of this monitoring program is to ensure onsite workplace safety, the following standards are considered more appropriate:

- For the non-radioactive inorganic compounds (including metals) it is appropriate to use Occupational Safety and Health Administration (OSHA) Personnel Exposure Limits (PELs), which are based on an 8-hour time-weighted average (TWA) exposure limit.
- For radioactive compounds it is appropriate to use standards derived from 40 CFR Part 20, Appendix B. Those values are known as Nuclear Regulatory Commission Derived Air Concentrations (DACs).

The ambient air thresholds derived from those sources are summarized in Table 3-6 and are applied to subsequent trigger level determinations. Because those ambient thresholds apply to occupational or industrial exposure, a safety factor of 10 was ultimately applied to the calculated trigger levels to ensure workers' safety and further limit any potential exposure due to offsite migration of airborne contaminants.

**TABLE 3.6. COC SCREENING LEVELS USED
FOR TRIGGER LEVEL ANALYSIS**

COC	Screening Level	Source
<i>Metals</i>		
Aluminum	15,000 µg/m ³	OSHA PEL
Arsenic	10 µg/m ³	OSHA PEL
Cadmium	5 µg/m ³	OSHA PEL
Chromium (total)	1,000 µg/m ³	OSHA PEL
Manganese	5,000 µg/m ³	OSHA PEL
Nickel	1,000 µg/m ³	OSHA PEL
Vanadium	50 µg/m ³	OSHA PEL
Zinc	500 µg/m ³	Idaho DEQ
<i>Other Non-Radioactive Inorganics</i>		
Fluorides	2,500 µg/m ³	OSHA PEL
Phosphorus ¹	100 µg/m ³	OSHA PEL
<i>Radioactive Isotopes</i>		
Lead-210	100 pCi/m ³	10 CFR Part 20 Appendix B
Polonium-210	300 pCi/m ³	10 CFR Part 20 Appendix B
Radium-226	300 pCi/m ³	10 CFR Part 20 Appendix B
Thorium-232	0.5 pCi/m ³	10 CFR Part 20 Appendix B
Uranium-238	20 pCi/m ³	10 CFR Part 20 Appendix B
¹ There is no OSHA PEL for <i>total</i> phosphorus to directly compare with historical monitoring data. However, OSHA PELs are given for airborne phosphorus compounds including yellow phosphorus, phosphorus pentachloride, phosphorus pentasulfide and phosphorus trichloride. For conservatism, the lowest of those limits (0.1 mg/m ³ or 100 µg/m ³ , for yellow phosphorus) was used for this evaluation.		

3.2.6 Calculate Maximum COC-to-Particulate Ratios for Each COC

Since the objective of this analysis is to identify PM₁₀ and TSP threshold concentrations that indicate potentially hazardous concentrations of one or more of the COCs, it was necessary to establish a reasonably conservative estimate of the fraction of each COC in airborne particulate matter. This was accomplished in two ways:

- The raw air quality data files from the 1993-1994 historical data set (containing 24-hour average values of COC, PM₁₀ and TSP concentrations) were used to calculate mean ratios of each COC to TSP and PM₁₀, denoted as [COC]/[PM₁₀] and [COC]/[TSP], respectively. This was done individually for sites 1 through 7. For conservatism, the highest calculated ratio among the sites was used for subsequent evaluations. Section 3.2.7 of this Plan contains the calculations for these analyses.
- Additionally, COC concentration data from background soil, process slag and phosphorus ore material was examined. Those data are reported in units of mg/kg for non-radioactive COCs, and pCi/g for radioactive COCs – making them directly comparable to the ratios for airborne particulate. The maximum observed fraction of each COC among those three material types was identified, and denoted as [COC]/[FILL].

These approaches provided two estimates of the maximum fraction of each COC in airborne particulate matter – one based on measured COC concentrations in airborne particulate matter, and a second based on COC concentrations in background soil, process slag and phosphorus that could potentially become airborne during remediation. For subsequent analyses, the higher of the two estimates was used. Table 3-7 summarizes the results for each COC using these methodologies, and the [COC]/[PM₁₀] and [COC]/[TSP] ratios that were ultimately used to calculate PM₁₀ and TSP trigger levels. Note that the ratios for non-radioactive COCs represent micrograms of COC per microgram of particulate, while those for radioactive COCs are in units of picocuries per microgram (pCi/μg) of particulate.

TABLE 3.7. SUMMARY OF COC-TO-PARTICULATE RATIOS

	Airborne Particulate		Soil - Fill	Maximum Ratio Used for Trigger Level Calculations	
<i>COC</i>	<i>Maximum [COC]/[PM₁₀] Ratio</i>	<i>Maximum [COC]/[TSP] Ratio</i>	<i>Maximum [COC]/[FILL] Ratio</i>	<i>[COC]/[PM₁₀]</i>	<i>[COC]/[TSP]</i>
Metals¹					
Aluminum	1.14E-02	1.21E-02	2.69E-02	2.69E-02	2.69E-02
Arsenic	3.53E-05	1.97E-05	1.46E-05	3.53E-05	1.97E-05
Cadmium	2.07E-04	1.32E-04	1.03E-04	2.07E-04	1.32E-04
Chromium (total)	3.09E-04	5.01E-04	8.22E-04	8.22E-04	8.22E-04
Manganese	3.75E-04	3.96E-04	7.10E-04	7.10E-04	7.10E-04
Nickel	2.61E-04	1.26E-04	1.26E-04	2.61E-04	1.26E-04
Vanadium	3.42E-04	5.75E-04	9.96E-04	9.96E-04	9.96E-04
Zinc	1.38E-03	8.90E-04	9.91E-04	1.38E-03	9.91E-04
Other Non-Radioactive Inorganics¹					
Fluorides	No Data	7.58E-02	1.78E-02	7.58E-02	7.58E-02
Phosphorus	9.52E-02	5.13E-02	6.59E-02	9.52E-02	6.59E-02
Radioactive Isotopes²					
Lead-210	1.58E-03	No Data	3.39E-05	1.58E-03	1.58E-03
Polonium-210	1.17E-03	No Data	2.88E-05	1.17E-03	1.17E-03
Radium-226	2.15E-05	No Data	5.40E-05	5.40E-05	5.40E-05
Thorium-232	6.91E-07	No Data	7.30E-07	7.30E-07	7.30E-07
Uranium-238	7.02E-06	No Data	3.16E-05	3.16E-05	3.16E-05
¹ Units are micrograms of COC per microgram of particulate.					
² Units are picocuries of COC per microgram of particulate.					

3.2.7 Calculate PM₁₀ and TSP Trigger Levels

The maximum particulate ratios for each COC (shown in the two rightmost columns in Table 3-7) were divided into the COC's respective screening level from Table 3-6 to calculate the PM₁₀ and/or TSP concentrations that would indicate an airborne concentration of potential concern for that COC. Those results are summarized in Table 3-8, which shows that ***the lowest PM₁₀ and TSP trigger level is associated with phosphorus.*** As discussed previously, there is no specific OSHA PEL for total phosphorus although there are PELs for several phosphorus compounds. For conservatism, the PEL for yellow phosphorus (the lowest of any of the compounds) was used. The PM₁₀ and TSP trigger level calculations for phosphorus then were calculated as shown below:

- Phosphorus has a maximum [COC]/[PM₁₀] ratio of 9.52E-02, a maximum [COC]/[TSP] ratio of 5.13E-02, a maximum [COC]/[FILL] ratio of 6.59 E-02, and an OSHA PEL of 100 µg/m³.
- The PM₁₀ trigger level was calculated as $100 \text{ µg/m}^3 \div 9.52\text{E-}02$, or 1,051 µg/m³.
- The TSP trigger level was calculated as $100 \text{ µg/m}^3 \div 6.59\text{E-}02$, or 1,518 µg/m³. Because the [COC]/[FILL] value was higher than the [COC]/[TSP] value, it was assumed to be more representative of potential worst-case ambient conditions.

A similar methodology was applied for the radioactive isotopes. Consider Lead-210, which has a maximum [COC]/[PM₁₀] ratio of 1.58E-03 pCi/µg, and a screening level limit of 100 pCi/m³:

- The PM₁₀ trigger level was calculated as $100 \text{ pCi/m}^3 \div 1.58\text{E-}03 \text{ pCi/µg}$, or 63,291 µg/m³.
- Note that TSP samples were not analyzed for radioactive isotopes. In such cases, the fraction of the COC in TSP material is assumed to be the same as for PM₁₀ and the TSP and PM₁₀ trigger levels are assumed to be identical.

To provide an additional margin of safety, each initial trigger level calculation was subsequently divided by 10; those results are shown in the rightmost two columns. Thus, for phosphorus the adjusted PM₁₀ and TSP trigger levels become 105 µg/m³ and 152 µg/m³. For Lead-210, the PM₁₀ trigger level becomes 6,329 µg/m³.

- Based on this analysis, the “worst-case” of the COCs is phosphorus, regardless of whether PM₁₀ or TSP is being monitored. As shown in Table 3-8, a PM₁₀ concentration of 105 µg/m³ or a TSP concentration of 152 µg/m³ indicates that airborne phosphorus concentrations may be approaching screening levels, and indicate that action should be taken to ensure that potentially hazardous levels of phosphorus do not develop.

TABLE 3.8. CALCULATED PARTICULATE TRIGGER LEVELS FOR COCS

COC	Unadjusted Trigger Level ¹		Adjusted Trigger Level ²	
	PM ₁₀	TSP	PM ₁₀	TSP
Metals				
Aluminum	557,621	557,621	55,762	55,762
Arsenic	283,286	507,614	28,329	50,761
Cadmium	24,155	37,879	2,415	3,788
Chromium (total)	1,216,545	1,216,545	121,655	121,655
Manganese	7,042,254	7,042,254	704,225	704,225
Nickel	3,831,418	7,936,508	383,142	793,651
Vanadium	50,201	50,201	5,020	5,020
Zinc	362,319	504,541	36,232	50,454
Other Non-Radioactive Inorganics				
Fluorides	32,982	32,982	3,298	3,298
Phosphorus	1,050	1,517	105	152
Radioactive Isotopes				
Lead-210	63,291	63,291	6,329	6,329
Polonium-210	256,410	256,410	25,641	25,641
Radium-226	5,555,556	5,555,556	555,556	555,556
Thorium-232	684,932	684,932	68,493	68,493
Uranium-238	632,911	632,911	63,291	63,291
Minimum Calculated Trigger Levels				
PM₁₀: 105 µg/m³ (limiting contaminant is phosphorus)				
TSP: 152 µg/m³ (limiting contaminant is phosphorus)				
¹ All values in micrograms per cubic meter.				
² All values in micrograms per cubic meter, adjusted downward by a factor of 10.				

TABLE 3-9: RADIONUCLIDE CONCENTRATIONS CORRESPONDING TO TSP TRIGGER LEVEL OF 152 µg/m³

Radionuclide	10 CFR 20 Appendix B Effluent (air) Concentrations Table 2 Column 1, (pCi/m3) ¹	Concentration equivalent to 152 ug/m3 Trigger Level (pCi/m3)
Pb-210	0.6	0.24
Po-210	0.9	0.18
Ra-226	0.9	0.0082
Th-232	0.004	0.00011
U-238	0.06	0.0048
¹ Value shown is limit for public exposure		

3.3 AIR QUALITY OVERSIGHT

Remedial Activities (RA) at the site will be conducted with oversight from an independent contractor for dust control and air quality monitoring or SAQC. Included among the primary

duties of the air quality oversight contractor will be maintenance of air monitoring equipment, management of air monitoring data and ongoing observation for dust being generated during the RA. The SAQC will immediately notify the remedial contractor and the EPA oversight contractor that additional actions are required to address any dust problems

3.4 RATIONALE FOR USE OF TSP MEASUREMENTS

As will be discussed in Section 3.4 of this document, real-time monitors will be configured for TSP for this project rather than PM_{10} or $PM_{2.5}$ (fine particulate). While contemporary ambient particulate monitoring commonly focuses on PM_{10} (and increasingly $PM_{2.5}$) because those particles are more easily retained in the lungs after inhalation, TSP monitoring is appropriate for this project because:

- The construction dust at FMC site is likely to be coarser than the PM_{10} particulate size. In general, smaller particle sizes require lower shear or wind velocities to move them. However, this relationship reverses for particle sizes less than 0.2 mm (Kirkby and Morgan, 1980). Therefore for undisturbed ground, the PM_{10} sized particles, which are less than 0.01 mm in size, are likely to be relatively stable compared to larger sand and silt sized particles. The $PM_{2.5}$ sized particles are the clay-sized fraction of the soil and are even more stable. Although disturbance may change this dynamic somewhat, most particulate emissions resulting from excavation and hauling will be larger than the PM_{10} and would not be measured by a PM_{10} or $PM_{2.5}$ sampler.
- Because PM_{10} and $PM_{2.5}$ are *subsets* of TSP, a sampler that is set to monitor TSP will also capture the PM_{10} and $PM_{2.5}$ materials. However, a sampler set to monitor PM_{10} and $PM_{2.5}$ particle sizes will miss a lot of the particulate in the air.
- TSP monitoring is more useful for evaluating the effectiveness of site dust control efforts, and will be protective of public health as well.
- TSP monitoring is more useful for evaluating the potential for spread of airborne dust from the site and will indicate the total amount of airborne COCs which could be deposited off-site, and not (only) some fraction of the dust.

3.5 DESIGN AND IMPLEMENT REAL-TIME MONITORING NETWORK

3.5.1 Real Time Particulate Monitoring

A network of real time particulate (TSP) monitors, situated at appropriate locations at the FMC OU, will be designed, installed and operated as part of this plan. A fleet of at least six portable, real-time particulate samplers (E-Samplers manufactured by Met One Instruments, Inc. of Grants Pass, Oregon) will be included in this network. The samplers will be sited with the objective of monitoring particulate concentrations both upwind and downwind of remediation activities on any given day, recognizing that the on-site work will vary in location over time. This strategy will allow characterization of both background particulate levels, as well as FMC's contribution to downwind particulate levels.

The prevailing winds at the site have a strong southwest component, as shown in the windrose in Figure 3-2.

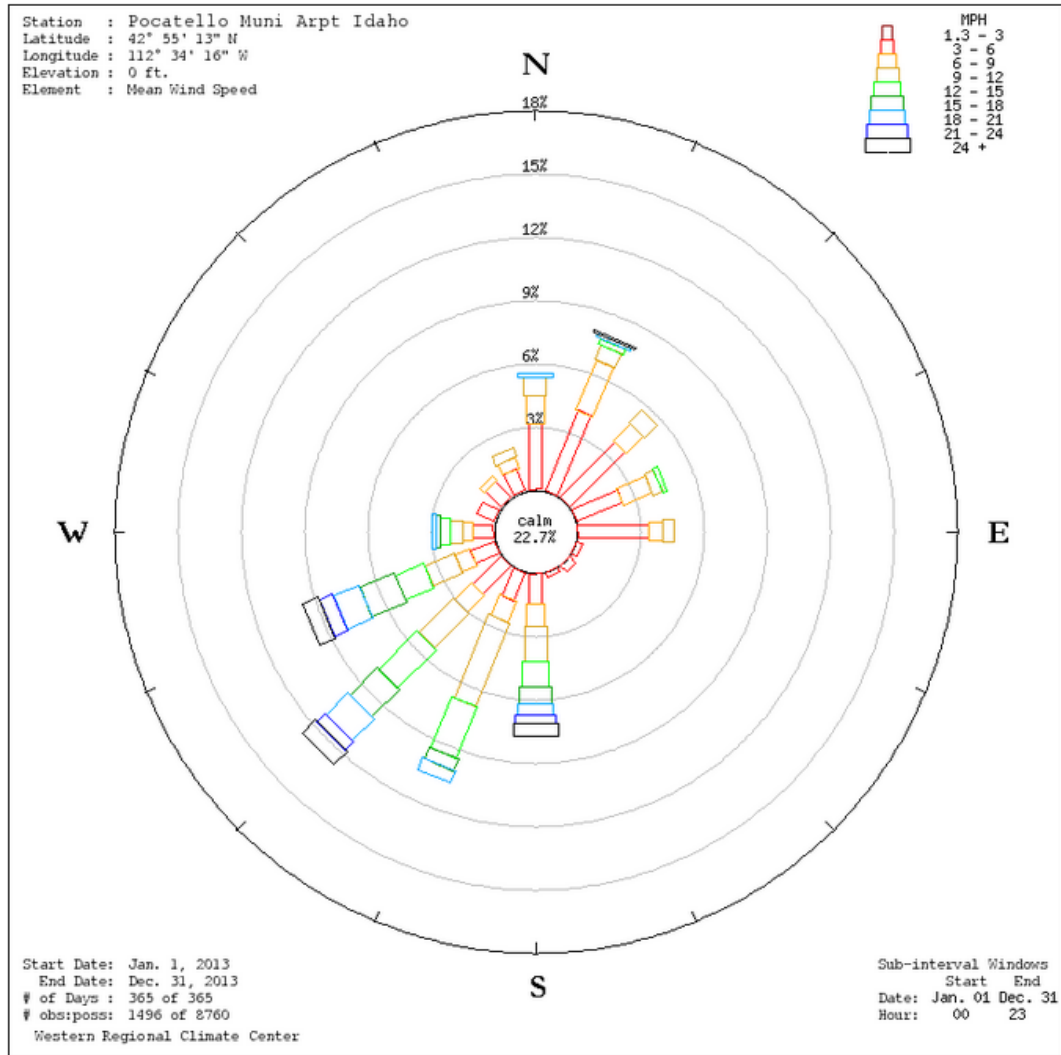
Three permanent monitors will be placed along the boundaries of the FMC OU, and at least three monitors will be designated portable units. A map of the placement of the permanent monitors and meteorological station is shown in Figure 3-3 below. The monitors would be placed as follows:

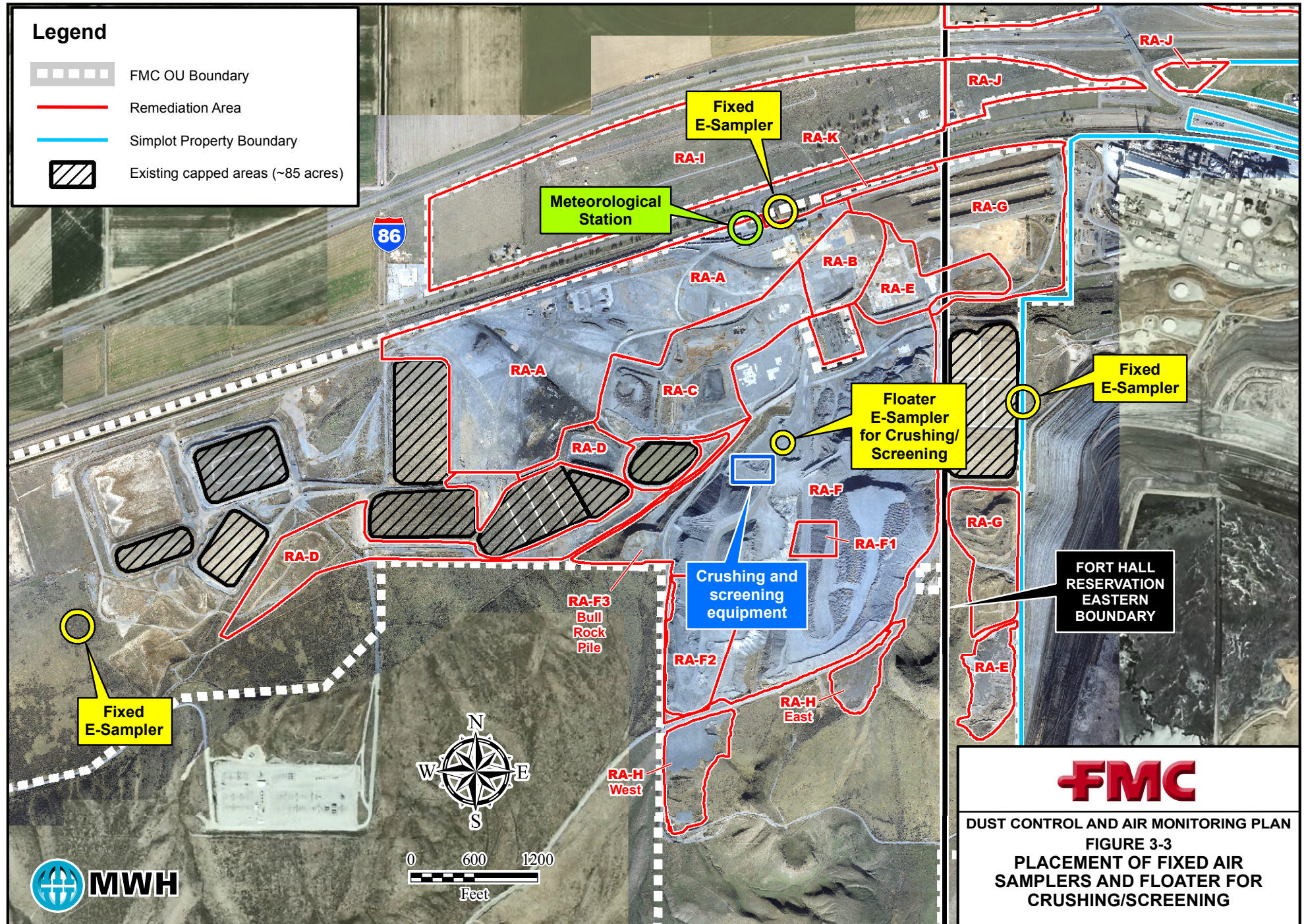
- One permanent site placed on the southwest boundary of the site, upwind of the prevailing wind direction for the Site-Wide Grading phase of remedial action.
- One permanent site placed near the center on the north boundary of the site, to monitor emissions leaving the site in the prevailing wind direction.
- One permanent site placed near the center on the eastern boundary of the site between FMC and Simplot. This monitor is meant to capture emissions leaving the site from a westerly wind and to monitor emissions coming onto the site from Simplot during an easterly wind condition.
- At least three portable “floaters” to be placed adjacent to, and downwind of, active remediation work sites within the FMC OU boundary. Exact locations will be identified by monitoring personnel in consultation with the EPA oversight contractor and/or EPA representative, and will be selected based on site-specific work plans.

Selection considerations will include planned construction activities, wind patterns, and protection of samplers from inadvertent damage. These monitors will need to be moved regularly as remediation progresses. Relocations of samplers will be documented, including the rationale for each move.

- Because the objective of the “floaters” is to monitor maximum airborne particulate concentrations resulting from remediation activities, they will generally be placed in close proximity (e.g., < 100 yards) in downwind directions from the most significant construction areas, subject to logistical constraints noted above. As shown in Figure 3-2 and indicated by local topography, winds at the FMC site should be predominantly from the southwest. Therefore, “floater” monitors will **generally** be located within 100 yards to the northeast of each significant construction area. However, field personnel will monitor wind forecasts from the Pocatello National Weather Service (NWS) office as well as readings from the on-site meteorological station on a daily basis, to ensure that the monitors are appropriately sited during atypical weather conditions. For example, Figure 3-2 shows that winds from the north-northeast approximately 8 percent of the time, and are sometimes strong. When such conditions occur, it is important that the “floaters” be relocated to the southwest of the construction areas until “normal” conditions return.

**FIGURE 3-2. 2013 WINDROSE FROM NATIONAL WEATHER
SERVICE STATIONS: POCATELLO, IDAHO**





3.5.2 Real Time Meteorological Monitoring

A meteorological monitoring station will be sited within the boundary of the FMC OU, in a location exposed to the prevailing winds. The meteorological station will be utilized to monitor wind conditions which will help pinpoint sources of particulate emissions and document weather conditions around dust events.

The meteorological tower will be a 10-foot tall portable tripod, equipped with a Campbell Scientific Model CR1000 datalogger with an internal data storage capacity of over 6 months of hourly meteorological data plus internet communication capabilities. The tower installation will be sufficiently sturdy to withstand weather extremes, yet can be easily relocated if circumstances require it. The station will include Prevention of Significant Deterioration (PSD) quality sensors for the following parameters:

- Wind Speed
- Wind Direction
- Temperature
- Precipitation
- Relative Humidity
- Other useful parameters agreed upon by EPA and FMC.

3.5.3 Networking and Data Accessibility of the Monitoring System

The particulate monitors and the meteorological station will feature full remote communications, allowing real time networking of the complete system. The system will publish real-time data to an internet website. This will allow stakeholders to view and download particulate and meteorological data, with no special software required by the end-user. Site access will be password-restricted as appropriate.

3.5.4 Real Time Alarm When Trigger Levels Are Exceeded

The network of samplers will be programmed to alarm when the pre-set TSP trigger level, as described in Section 3.2 of this Monitoring Plan, is recorded by one or more of the E-Samplers. This alarm will be broadcast to the SAQC and other designated personnel via e-mail or telephone, allowing immediate response and investigation by personnel on-site. The

internet page will show which monitor has been triggered and the prevailing wind conditions, helping point to the source of excess emissions.

3.6 RATIONALE FOR USE OF MET ONE E-SAMPLERS

The E-Samplers are rugged, portable, durable real-time particulate monitors, made specifically for long-term unattended operations outdoors. Details and specifications for the E-Sampler can be found at:

http://www.metone.com/documents/E-SAMPLER_Brochure.pdf

FIGURE 3-4. PHOTOS OF MET ONE E-SAMPLER



The primary advantages of the E-Sampler include:

- The sampler can be operated unattended for extended periods – unlike other samplers requiring frequent attention.
- The sampler includes a weatherproof enclosure and is deployed on a portable tripod.

- The sampler can be operated from either AC or solar power.
- Measurement range is 0.001 mg/m³ (1 µg/m³) to 65 mg/m³ (65,000 µg/m³).
- Includes both analog and RS-232 output options, and supports radio and modem communication.
- Can be operated with averaging periods from 1 to 60 minutes.
- Unit weighs only 28 pounds and can be easily moved by one person.
- Hydrometrics has successfully employed these samplers in conjunction with remediation and construction activities at Point Ruston, WA.

The E-Samplers offer advantages from a logistical standpoint, including lower required and expected down time, cost, ease of use, portability and dependability. An E-Sampler can easily be shut down, relocated, and restarted by a single minimally-trained field operator in 30 minutes or less with no special equipment. Otherwise, there is essentially no sampler downtime beyond routine quality assurance activities such as flow checks/calibrations, leak checks and audits. These activities are generally less time-intensive for E-Samplers than for other particulate monitors.

By contrast, other continuous particulate monitors (such as the EPA Reference Method Thermo Environmental TEOM and Met One BAM-1020 samplers) are considerably larger and more complex, and must be housed inside a substantial climate-controlled shelter that requires AC power. Relocation of such units in response to changing construction operations and wind conditions is a substantial task, and considerable training is required to achieve proficiency in their operation. If problems arise, troubleshooting can be difficult and replacement parts are not always immediately available. That issue will not be a concern for the E-Sampler network because FMC proposes to purchase ten units, with a maximum of 7-8 in use at any given time. In the event that an E-Sampler fails, it will immediately be replaced with an identical unit so that sampling can continue uninterrupted. The problematic unit then will be returned to the manufacturer for repair.

Although this E-Sampler is not designated by EPA as a Reference or Equivalent Method for measurement of particulates, several studies have been undertaken to compare the

performance of the E-Sampler to Reference Method or Equivalent Method samplers. One of the more intensive studies was done by the United States Forest Service (USFS). USFS uses these instruments to monitor smoke from wildfires and has evaluated the E-Sampler's performance for monitoring PM_{2.5} particles against the BGI PQ-200 Federal Reference Method Sampler. It is important to note that the samplers employ fundamentally different technologies:

- The BGI PQ-200 sampler draws air through a pre-weighed filter at a known, constant flow rate for a period of 24 hours. The filter then is weighed after sampling, and the sample flow rate and particulate mass collected on the filter are used to calculate the average ambient particulate concentration over the 24-hour sampling period. The PQ-200 is a 24-hour episodic sampler, not a continuous hourly particulate monitor.
- The E-Sampler uses the principle of light scatter to determine real-time particulate concentrations. A filter may be used to calibrate the instrument's site-specific response, but is not required for operation.

Despite these inherent differences, the two instruments produced comparable results when used for colocated sampling of artificially-generated smoke over thirty discrete 24-hour periods. A regression analysis of the 30 paired measurements produced the following results of the form $Y = MX + B$, where:

Y = Indicated E-Sampler Concentration

X = BQ-200 Reference Sampler Concentration

M = Slope = 1.13

B = Intercept ($\mu\text{g}/\text{m}^3$) = 3.41

R^2 = Correlation Coefficient = 0.9628.

These results indicate that E-Sampler measurements correlate well with the PQ-200, with a small positive bias. It should be emphasized that the E-Sampler includes the option of operation with a pre-weighed sampling filter, which can be used to fine-tune its site-specific response to ambient particulate concentrations. A pre-weighed filter will be installed in each sampler at the outset of monitoring so that an empirical calibration factor can be established

for each sampler. Additional filter calibration checks will be performed when necessary to update these factors. These filters will also be submitted for analysis of COCs.

3.7 REAL-TIME MONITORING SCHEDULE

Real-time monitoring will be performed on the site per this Plan any time that construction activities described in this plan associated with the RDRA UAO remedial action construction are being carried out on the site. As indicated in Section 2.1.7, there are currently no such activities planned during December 15th through February 15th and therefore, real-time monitoring would not be performed during this shut-down period. However, the on-site contractor will perform daily visual monitoring for dust during this period. This contractor will have the available resources to take necessary actions to control any fugitive dust generation should it be observed.

During the construction season, February 15th through December 15th, real-time monitoring will be performed during periods when the RDRA UAO remedial action construction activities described in this plan are being performed at the site. For example, if the operating shift is 10 hours per day, 6 days per week, the real-time monitoring will be performed during the operational hours only. Effectiveness of wetting and water application procedures will be evaluated by the presence or absence of visible dust. If visible dust is present, FMC will implement continuous (i.e., 24 hours a day, 7 days a week) monitoring downwind of areas of disturbed or exposed soils and continue with water application procedures until visible dust is eliminated.

3.8 QUALITY ASSURANCE

Quality assurance is critical to the collection of reliable, high-quality data that can be used to support operational decisions during remediation. Proposed quality assurance of this monitoring system will include:

- Calibration of the meteorological system and each E-Sampler at the time of installation using NIST-traceable calibration standards.

- Monthly checks of the E-Samplers' flow rates and indicated temperature and pressure readings by the operator stationed on-site.
- Quarterly inspections/audits of monitoring equipment using separate equipment from that used by the site operator.
- Quarterly maintenance and calibration of equipment in accordance with the manufacturers' recommendations.
- Frequent remote monitoring of the meteorological system and E-Sampler readings by experienced personnel, so that developing problems can be quickly detected and corrected.

3.9 DATA REPORTING

The FMC OU RD/RA UAO monthly report submitted to EPA by the 15th day of the following month will include a listing of periods when particulate levels were exceeded and periods of E-Sampler downtime (i.e., when any given E-Sampler should have been collecting data, but was not operating due to equipment failure or other factors).

A compiled monitoring report will be submitted within 45 days after the end of each calendar quarter as an attachment to the FMC OU RD/RA UAO monthly report. These reports will include:

- Hourly particulate readings for each E-Sampler monitoring location.
- Hourly readings for each meteorological instrument, including wind speed, wind direction, wind direction standard deviation, temperature, relative humidity and precipitation.
- Monthly and quarterly wind roses for the meteorological site.
- A cumulative listing of periods when particulate levels were exceeded and periods of E-Sampler downtime (i.e., when any given E-Sampler should have been collecting data, but was not operating due to equipment failure or other factors).
- Monthly flow temperature and pressure checks conducted on the E-Samplers.
- Equipment calibrations and audits performed during the quarter.

4.0 REFERENCES

- 10 CFR 20, Nuclear Regulatory Commission, Standards for Protection Against Radiation, Appendix B - Annual Limits on Intake (Alis) and Derived Air Concentrations (Dacs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage.
- 29 CFR 1910, Occupational Safety and Health Administration, Permissible Exposure Limits.
- Bechtel, 1995. Remedial Investigation for the Eastern Michaud Flats Site: Part III, Air Quality Characterization / Air Monitoring Report.
- FARR, 2005. Federal Air Rule for Indian Reservations in Idaho, Oregon, and Washington.
- Kirkby, M.J. and Morgan, R.P.C., 1980. Soil Erosion.
- MWH, 2013. Final Remedial Design Work Plan.
- U.S. EPA, 2012. Interim Amendment to the Record of Decision for the EMF Superfund Site FMC Operable Unit.
- U.S. EPA, 2013a. Remedial Design/Remedial Action (RD/RA) Unilateral Administrative Order.
- U.S. EPA, 2013b. Regional Screening Levels (Formerly PRGs),
[HTTP://WWW.EPA.GOV/REGION9/SUPERFUND/PRG/](http://www.epa.gov/region9/superfund/prg/)

DUST CONTROL AND AIR MONITORING PLAN

APPENDIX A

INFORMATION ON DUST CONTROL TACKIFIERS

Dust Guard Liquid®

Product Data Sheet



9900 West 109th Street – Suite 100
Overland Park, Kansas 66210
Phone 800-755-7258 Fax 800-359-7258

DUSTGARD® LIQUID

PRODUCTION LOCATION

Ogden, Utah

PRODUCT DESCRIPTION

Produced naturally from the Great Salt Lake, DustGard Liquid is formulated to control dust and stabilize soil on unpaved roads, stockpiles, and other sources of fugitive dust. DustGard Liquid is a light amber liquid with a density of approximately 185 gallons per ton.

PHYSICAL PROPERTIES

Specific Gravity	1.31+/- 0.02
pH (5% Solution)	7.0 - 9.0
Weight	10.7 - 11.1 lbs./gallon

Typical Analysis			Typical	Range
Magnesium Chloride	MgCl ₂	(%)	30.9	29 - 33
Sulfate	SO ₄	(%)	2.3	1.7 - 3.0
Potassium	K	(%)	0.3	0.1 - 0.5
Water	H ₂ O	(%)	66	62 - 70

METHOD OF ANALYSIS

All testing is from North American Salt's internal quality control procedures, which are available upon request.

APPLICATION AND STORAGE

This liquid MgCl₂ product in storage should be agitated regularly to minimize precipitation of undesirable solids/crystals. Application equipment should be washed daily with water. Storage equipment should be rinsed with water to prevent buildup of solids. Aluminum storage tanks or hauling equipment should not be grounded. Overapplication of MgCl₂ may result in unusually slippery road surfaces and should be avoided.

Product Description and Codes	UPC code	Product Code
Bulk		

[Home](#)[Dust Control](#)[Road Stabilization](#)[Usage Recommendations](#)[All-Natural Product](#)[Technical Resources](#)[Distributor Locator](#)[Cost Calculator](#)[Contact Us](#)

Preparation & Application

Road Surface Preparation:

If the surface is permeable, smooth, firm and shaped for drainage, it's ready for application. Before applying DustGard® liquid, make sure that ruts, washboards, potholes, drainage problems, gravel segregation and hard, impervious areas have been rectified - blading can take care of most of these problems.



Pre-Watering:

Before applying DustGard liquid, the road should be watered, ideally to a depth of 3 to 4 inches to break the surface tension and allow maximum penetration.

Application:

Recommended application rate is 1/2 gallon per square yard, split in two 1/4 gallon per square yard applications. This will ensure deep, even penetration for good dust control and stabilization.

How much product do you need? Multiply 300 gallons x width of road (in feet) x length (in miles) for the approximate amount for 1/2 gallon per square yard.

Example: to treat a 12-foot-wide road, 300 gallons x 12 ft x 1 mile is 3600 gallons per mile.

Road Shoulder Width	Square Yards per Mile	Gallons per Mile @ .50 Gal/Sq Yd	Miles per Truckload (4400 Gallons per Load)
4	2,347	1,173	3.75
8	4,694	2,346	1.88
12	7,040	3,520	1.25
16	9,386	4,694	0.94
20	11,372	5,866	0.75

Compacting:

As blading loosens the surface, it should be compacted with a vibratory or pneumatic roller to restore a dense, tight driving surface.



© 2014 Compass Minerals. All Rights Reserved
9900 W. 109th St., Suite 100, Overland Park, KS 66210 | Phone: 913-344-9200

[TERMS OF USE](#) [PRIVACY STATEMENT](#) [CONTACT US](#)

1. Product and Company Identification

Product Name	Magnesium Chloride Aqueous Solution
CAS #	Mixture
Product use	Dust suppression, deicing, general industrial, and speciality uses.
Manufacturer	North American Salt Company A Compass Minerals Company 9900 West 109th Street, Suite 100 Overland Park, KS 66210 US Phone: 913-344-9200
CHEMTREC	1-800-424-9300
CANUTEC	1-613-996-6666

2. Hazards Identification

Emergency overview	Contact may cause eye irritation.
Potential short term health effects	
Routes of exposure	Eye, Skin contact, Inhalation, Ingestion.
Eyes	May cause irritation.
Skin	Non-irritating to the skin.
Inhalation	May cause respiratory tract irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Target organs	Eyes. Respiratory system.
Chronic effects	None known.
Signs and symptoms	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
OSHA Regulatory Status	This product is NOT known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Potential environmental effects	See section 12.

3. Composition / Information on Ingredients

Ingredient(s)	CAS #	Percent
Magnesium chloride	7786-30-3	15 - 40

4. First Aid Measures

First aid procedures	
Eye contact	Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.
Skin contact	Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.
Inhalation	If symptoms develop move victim to fresh air. If symptoms persist, obtain medical attention.
Ingestion	Do not induce vomiting. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.
General advice	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Keep out of reach of children.

5. Fire Fighting Measures

Flammable properties	Not flammable by WHMIS/OSHA criteria.
Extinguishing media	
Suitable extinguishing media	Treat for surrounding material.

Unsuitable extinguishing media	Not available
Protection of firefighters	
Specific hazards arising from the chemical	Not available
Protective equipment for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus.
Hazardous combustion products	May include and are not limited to: Halogenated compounds. Hydrogen chloride.
Explosion data	
Sensitivity to mechanical impact	Not available
Sensitivity to static discharge	Not available

6. Accidental Release Measures

Personal precautions	Avoid inhalation of vapors or mists. Keep people away from and upwind of spill/leak. Do not touch or walk through spilled material.
Environmental precautions	Prevent entry into waterways, sewers, basements or confined areas.
Methods for containment	Stop leak if you can do so without risk.
Methods for cleaning up	Before attempting clean up, refer to hazard data given above. Small spills may be absorbed with non-reactive absorbent and placed in suitable, covered, labelled containers. Finish cleaning by spreading water on the affected surface and dispose of according to local and regional authority requirements.

7. Handling and Storage

Handling	Use good industrial hygiene practices in handling this material. Avoid breathing vapors or mists of this product.
Storage	Keep out of reach of children. Store in a closed container away from incompatible materials.

8. Exposure Controls / Personal Protection

Exposure limits	
Ingredient(s)	Exposure Limits
Magnesium chloride	ACGIH-TLV Not established OSHA-PEL Not established
Engineering controls	<p>TWA PEL: No specific limits have been established for magnesium chloride (a soluble substance). As a guideline, OSHA (United States) has established the following limits which are generally recognized for inert or nuisance dust. Particulates Not Otherwise Regulated (PNOR): 5mg/cu.m. Respirable Dust 8-Hour TWA PEL, 15mg/cu.m. Total Dust 8-Hour TWA PEL.</p> <p>TWA TLV: No specific limits have been established for magnesium chloride (a soluble substance). As a guideline, ACGIH (United States) has established the following limits which are generally recognized for inert or nuisance dust. Particulates (insolubles) Not Otherwise Classified (PNOC): 10mg/cu.m. Inhalable Particulate 8-Hours TWA TLV, 3mg/cu.m. Respirable Particulate TWA TLV.</p> <p>Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.</p>
Personal protective equipment	
Eye / face protection	Safety glasses
Hand protection	Rubber gloves. Confirm with a reputable supplier first.
Skin and body protection	As required by employer code.
Respiratory protection	Where exposure guideline levels may be exceeded, use an approved NIOSH respirator or NIOSH-approved filtering facepiece.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.

9. Physical and Chemical Properties

Appearance	Liquid
Color	Colourless to light amber
Form	Liquid
Odor	Odorless
Odor threshold	Not available
Physical state	Liquid
pH	7 - 9 (5% solution)
Melting point	Not available
Freezing point	-1 °F (-18.33 °C) (30% solution, periodically mixed to ensure homogeneity)
Boiling point	224.99 °F (107.22 °C)
Pour point	Not available
Evaporation rate	Not available
Flash point	None
Auto-ignition temperature	Not available
Flammability limits in air, lower, % by volume	Not applicable
Flammability limits in air, upper, % by volume	Not applicable
Vapor pressure	Not available
Vapor density	Not available
Specific gravity	1.24 - 1.34 (H ₂ O = 1)
Octanol/water coefficient	Not available
Solubility (H ₂ O)	Easily soluble in cold water, hot water, methanol, acetone.
Percent volatile	Not available

10. Stability and Reactivity

Reactivity	None known.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	Do not mix with other chemicals.
Incompatible materials	Oxidizing agents. Acids.
Hazardous decomposition products	May include and are not limited to: Halogenated compounds. Hydrogen chloride.

11. Toxicological Information

Component analysis - LC50

Ingredient(s)	LC50
---------------	------

Magnesium chloride	Not available
--------------------	---------------

Component analysis - Oral LD50

Ingredient(s)	LD50
---------------	------

Magnesium chloride	2800 mg/kg rat
--------------------	----------------

Effects of acute exposure

Eye	May cause irritation.
Skin	Non-irritating to the skin.
Inhalation	May cause respiratory tract irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Sensitization	Non-hazardous by WHMIS/OSHA criteria.
Chronic effects	Non-hazardous by WHMIS/OSHA criteria.
Carcinogenicity	Not classified or listed by IARC, NTP, OSHA and ACGIH.
Mutagenicity	Non-hazardous by WHMIS/OSHA criteria.
Reproductive effects	Non-hazardous by WHMIS/OSHA criteria.

Teratogenicity	Non-hazardous by WHMIS/OSHA criteria.
Name of Toxicologically Synergistic Products	Not available

12. Ecological Information

Ecotoxicity	May be harmful to freshwater aquatic species and to plants that are not saline tolerant.	
Ecotoxicity - Freshwater Algae - Acute Toxicity Data		
Magnesium chloride	7786-30-3	72 Hr EC50 Desmodesmus subspicatus: 2200 mg/L
Ecotoxicity - Freshwater Fish - Acute Toxicity Data		
Magnesium chloride	7786-30-3	96 Hr LC50 Gambusia affinis: 4210 mg/L [static]; 96 Hr LC50 Pimephales promelas: 1970-3880 mg/L [static]
Ecotoxicity - Water Flea - Acute Toxicity Data		
Magnesium chloride	7786-30-3	24 Hr EC50 Daphnia magna: 1400 mg/L; 48 Hr EC50 Daphnia magna: 140 mg/L [Static]
Persistence / degradability	Not available	
Bioaccumulation / accumulation	Not available	
Mobility in environmental media	Not available	
Environmental effects	Not available	
Aquatic toxicity	Not available	
Partition coefficient	Not available	
Chemical fate information	Not available	
Other adverse effects	Not available	

13. Disposal Considerations

Disposal instructions	Review federal, state/provincial, and local government requirements prior to disposal.
Waste from residues / unused products	Not available
Contaminated packaging	Not available

14. Transport Information

U.S. Department of Transportation (DOT)	Not regulated as dangerous goods.
Transportation of Dangerous Goods (TDG - Canada)	Not regulated as dangerous goods.

15. Regulatory Information

Canadian federal regulations	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.
WHMIS status	Not Controlled
Occupational Safety and Health Administration (OSHA)	
29 CFR 1910.1200 hazardous chemical	No
US Federal regulations	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
CERCLA (Superfund) reportable quantity	None
Superfund Amendments and Reauthorization Act of 1986 (SARA)	
Hazard categories	Immediate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No
Clean Air Act (CAA)	Not available

Clean Water Act (CWA)

Not available

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Inventory name**Country(s) or region**

Canada

Canada

United States & Puerto Rico

Inventory name

Domestic Substances List (DSL)

Non-Domestic Substances List (NDSL)

Toxic Substances Control Act (TSCA) Inventory

On inventory (yes/no)*

Yes

No

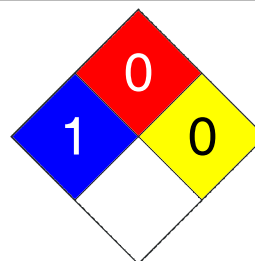
Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

LEGEND HMIS/NFPA	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0

Health	/ 1
Flammability	0
Physical Hazard	0
Personal Protection	B

**Disclaimer**

Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

Issue date

16-Feb-2012

Effective date

15-Jan-2012

Expiry date

15-Jan-2015

Prepared by

Dell Tech Laboratories Ltd. (519) 858-5021

Other information

This MSDS conforms to the ANSI Z400.1/Z129.1-2010 Standard.

Road Oyl®

Road Oyl®

Resin Modified Emulsion



Versatile and multi-purpose for dust control, erosion control and stabilization

Road Oyl is a resin modified emulsion that provides a cold applied high performance treatment for bare earth areas, stockpiles and for unpaved road surfaces. Formulated from tree resin ingredients, this state-of-the-art, non-ionic emulsion technology is unique in its high bonding strength and is appropriate for use even in close proximity to wetland areas and other areas of environmental sensitivity. Road Oyl provides the clean, high performance technology needed for any type of project.

Originally developed to solve severe dust problems on mine haul roads, Road Oyl has been used around the world for over 15 years.

Since Road Oyl is made from all natural ingredients harvested on a sustainable basis, it has never had a problem being approved for use in any application or as part of an environmental permit issued to an operating entity such as a landfill, steel mill or mine.



Road Oyl is versatile and multi-purpose in use for dust control, erosion control, stabilization, shoulder treatments and other specialized applications. It has been specifically designed and proven to be a long-term solution for efficient control of road dust as well as for use on mine tailings and stockpiles. Whether you are creating a landing strip, access road, haul road, hardened surface, trail or have erosion control requirements, Road Oyl provides a reliable, environmentally friendly binder.

Traffic on a Road Oyl surface will compact the surface into a smooth dust free pavement-like surface. It penetrates road aggregate and binds it into a surface proven stronger than asphalt. Road Oyl darkens the aggregate or soil that it's applied to slightly but maintains the same basic look, which makes it desirable in natural settings. Road Oyl will not track when applied as directed.

What is Road Oyl?

Road Oyl is a natural flexible pavement binder emulsion formulated from pine rosin and pitch in water. The pitch and rosin, which comprise roughly 50% of Road Oyl by weight, are co-produced with other timber products from southern pine in the southeastern United States. Pine pitch is a black, viscous "tar" derived from the distillation of wood; before the development of coal tar pitch. Pine rosin is the residue from distillation of turpentine oil from raw turpentine. The Road Oyl liquid is brownish in color with mild odor. When rubbed between the fingers, it becomes extremely sticky as the water evaporates.

Environmentally Friendly

Made from all natural products harvested on a sustainable basis, Road Oyl is non-hazardous and safe for the environment.

Economical

Road Oyl is shipped efficiently as a high concentrate and diluted with water before application. With its long lasting nature, you spend less time reapplying, saving you both time and money.

Long Lasting

The condition of the road, the degree of Road Oyl penetration, and the amount of traffic combine to determine the life of a Road Oyl application. It also helps stabilize the road in winter by protecting the road from water intrusion.

Physical Properties

Specific Gravity:	0.9 – 1.1 Kg/L
Weight per Gallon (US)	7.497 – 9.163 #/gallon
Appearance:	Light brown colored liquid emulsion
Odor:	Musty, woody
pH:	6 - 9
Boiling Point:	212°F (100°C)
Solubility in Water:	Dilutable
OSHA Hazard:	No
Flammability:	Non-flammable, non-combustible
Stability:	Stable under normal handling conditions
Corrosiveness:	Similar to water
Incompatibilities:	Can react with strong organic oxidizing materials, strong acids and strong bases.

Road Oyl is versatile and multi-purpose in use for dust control, erosion control, stabilization, shoulder treatments and other specialized applications.

Road Oyl®

Frequently Asked Questions

1. How long will it last?

It depends on a number of factors such as traffic, track-on, and spillage as well as the condition of the road. Applications are cumulative, so reapplications should become more dilute and less frequent until the maintenance level is reached.

2. Who else is using it?

Road Oyl has been used all over the world for over 15 years, from the U.S. Military to landfills, steel mills, coal mines and gold.

3. What dilution ratio should I use?

Road Oyl can be diluted from 4:1 to 15:1 with water. The lower the dilution the more control you will get with each application and the less often you should have to spray. With track on or spillage, use higher dilutions and spray more often.

4. Is it EPA approved?

ROAD OYL® is made from all natural ingredients harvested on a sustainable basis. It has never had a problem being approved for use in any application or as part of an environmental permit issued to an operating entity such as a landfill, steel mill, or mine.

5. Will it harm the water truck?

No. When finished spraying, flush the system with water until it runs clear.

6. Will it get on the vehicles?

When freshly applied, it might splash on nearby vehicles.

7. How do I clean it up?

Fresh splashed product can be flushed off with water. Dried product can be cleaned with hot water and detergent.

8. Will it track?

Road Oyl will not track when applied as directed. Excessive application or oversaturation will track when freshly applied.

9. Does it cause rust?

No. It is non-corrosive as well as non-hazardous, non-flammable, and non-toxic.

10. Will it harm my roads?

No. Unlike salts or other water soluble products, it will actually help stabilize the road rather than draw excessive moisture to the road base that can be harmful.

11. Do I need to grade the roads first?

It is not necessary to grade the road. However, we recommend, if the road is rough, grading the road first.

12. How much does it cost?

Road Oyl is an economical solution to dust control. Remember, this is a concentrate that is diluted from 4:1 to 15:1 with water before use. Your actual cost will be determined by the dilution ratio and frequency of application.

EMERGENCY PHONE NUMBER: 330-456-3121

ROAD OYL® MSDS

MATERIAL SAFETY DATA SHEET

SECTION I — IDENTIFICATION OF SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

TRADE NAME:Road Oyl
CHEMICAL NAME:Specialized Dust Suppressant and Soil Stabilization
Agent
SYNONYMS:Dust Retardant
CHEMICAL FAMILY:N/A
MOLECULAR WEIGHT:N/A
FORMULA:N/A
CAS REGISTRY NO.:Product a Blend - No Number Assigned

SECTION II — COMPOSITION/INFORMATION ON INGREDIENTS

NAME	CAS REG NO.	WT. %
Proprietary pitch/rosin blend	8016-81-7	40 – 60
	8050-09-7	
	8052-10-6	

SECTION III — HAZARDS IDENTIFICATION

Eye and skin irritant.

SECTION IV — FIRST AID MEASURES

EYES:Flush eyes with flowing water at least 15 minutes,
get medical attention.Remove contact lenses.
INHALATION:Move subject to fresh air. If victim is not breathing
perform artificial respiration. Administer oxygen if
available. Keep victim warm and at rest. Seek
medical attention as soon as possible if breathing
difficulty persists.
SKIN:Flush with large amount of water or wash with soap
and water. Seek medical attention if irritation
persists.
INGESTION:DO NOT induce vomiting because of aspiration into
the lungs. Seek medical attention if irritation
persists.

NEVER GIVE FLUIDS OR INDUCE VOMITING IF PATIENT IS UNCONSCIOUS OR HAVING CONVULSIONS.

NOTE TO PHYSICIAN:Monitor respiratory distress. If cough or difficulty
breathing develops, evaluate for respiratory tract
irritation, bronchitis or pneumonitis.

SECTION V — FIRE FIGHTING MEASURES

FLAMMABILITY:Nonflammable, but will burn on prolonged
exposure to flame or high temperature.
FLASH POINT
(TEST METHOD):>200°F (>94°C), aqueous blend
AUTOIGNITION
TEMPERATURE:Not determined
UNUSUAL FIRE AND
EXPLOSION HAZARDS:Do not cut, weld, heat of drill or pressurize
empty container.
MATERIALS TO AVOID:Avoid contact with strong oxidizing agents,
including peroxides, chlorine and strong acids.
PRODUCTS OF
COMBUSTION:Carbon dioxide, carbon monoxide, smoke and
irritating fumes.

EXTINGUISHING MEDIA AND INSTRUCTIONS:

If a tank, railcar or tank truck is involved in a fire isolate for 0.5 miles in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from the area and let the fire burn itself out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of the tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion.

SMALL FIRE:use dry chemicals, foam, CO₂.

LARGE FIRE:use water spray, fog of foam. For small
outdoor fires portable extinguishers may be
used and SCBA (self contained breathing
apparatus) may not be required. For all indoor
fires and any significant outdoor fires SCBA if
required. Respiratory and eye protection are
required for fire fighting personnel.

SECTION VI - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK

PROCEDURES:ELIMINATE ALL IGNITION SOURCES. Stop leak
without risk and contain spill. Absorb with inert
absorbent materials such as clay or sand. Place
absorbent in closed metal containers for later
disposal or burn in appropriate facility. Keep spills
out of sewers and open bodies of water.

SECTION VII — HANDLING AND STORAGE

STORAGE:Keep in a cool, dry, ventilated storage area and in
closed containers. Keep away from sources of
ignition and oxidizing materials. DO NOT FREEZE.
HANDLING:KEEP AWAY FROM SOURCES OF IGNITION.
Do not reuse empty containers. Practice good
hygiene. Wash hands before eating. Launder
clothes before reuse. Discard saturated leather
goods.

SECTION VIII — EXPOSURE CONTROL/PERSONAL PROTECTION

RESPIRATORY

PROTECTION:None required if good ventilation is maintained. If
mist is generated by heating or spraying use a
NIOSH approved organic respirator with a mist
filter.

VENTILATION:Under normal handling conditions special
ventilation is not necessary. If operation generates
mist or fumes use ventilation of keep exposure to
airborne contaminants below exposure limits.

EYE PROTECTION:Chemical splash, goggles recommended.

PROTECTIVE

CLOTHING:Clothing to minimize skin contact, long sleeves,
boots or shoes. For casual contact PVC gloves are
suitable, for prolonged contact use neoprene or
nitrile gloves.

MATERIAL SAFETY DATA SHEET

BOILING/MELTING POINT @ 760 mm Hg:212°F (100°C)
VAPOR PRESSURE mm Hg @ 20°C:.....N/D
SPECIFIC GRAVITY OR BULK DENSITY:0.9 – 1.1
SOLUBILITY IN WATER:dilutable
APPEARANCE:light brown colored liquid
 emulsion
ODOR:musty, woody
pH:6 – 9

STABILITY:Stable under normal handling conditions.

CHEMICAL

INCOMPATIBILITY:Can react with strong organic oxidizing materials, strong acids and strong bases.

HAZARDOUS DECOMPOSITION

PRODUCTS:Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide, smoke, hydrocarbons and irritating fumes of sulfide oxides.

HAZARDOUS

POLYMERIZATION:Does not occur under normal industrial conditions.

CONDITIONS TO AVOID:Excessive heat and flame.

CORROSIVE TO METAL:Similar to water

INHALATION:	Inhalation is highly unlikely. However prolonged or repeated inhalation of fumes or mists may cause irritation to the respiratory tract. Product deposits in lungs may lead to fibrosis and reduced pulmonary function.
SKIN:	Prolonged or repeated contact may cause skin irritation, dermatitis or oil acne.
EYES:	Prolonged or repeated contact may be irritating to eyes. Will not cause permanent damage.
INGESTION:	Relatively non toxic to digestive tract.

When used and applied properly ROAD OYL is not known to pose any ecological problems.

METHOD:Consult your local authorities for regulations.
Preferred waste management: recycle or reuse,
incinerate with energy recovery, disposal in a
licensed facility. Disposal facility should be
compliant with state, local and federal government
regulations.

D.O.T. PROPER SHIPPING NAME (49CFR172.101):Dust Control Agent
D.O.T. HAZARD CLASSIFICATION (49CFR172.101): ..Non-regulated
D.O.T. PLACARDS REQUIRED:None
BILL OF LADING DESCRIPTION:Dust suppressant

EPA SARA Title III hazard class:	None
OSHA HCS hazard class:	Irritant
CERCLA (40 CFR 302.4):	None
TSCA:	Components of this product are listed on TSCA inventory.
Canadian WHMIS classification:	D2B, irritant
Canadian DSL:	All components of this product are listed on DSL (Domestic Substance List).
California Proposition 65:	Does not contain any Prop 65 chemicals.

N.D. = Not Determined
N.A. = Not Applicable
N.T. = Not Tested
< = Less Than
> = Greater Than

Soiltac/Gorilla Snot®



Letter of Introduction

Soilworks®, LLC is the innovator and manufacturer of Soiltac® soil stabilizer and dust control agent. Soiltac® is an eco-safe, biodegradable, liquid copolymer used to stabilize and solidify any soil or aggregate as well as erosion control and dust suppression.

Soilworks'® recent advances in simulation, chemistry, processing techniques, and analytical instrumentation have allowed a whole host of new types of polymer particles and polymer nanotechnology applications to be realized. These advances led to the revolutionary development of nanotechnology into Soiltac's® superior performance.

Once applied to the soil or aggregate, the copolymer molecules coalesce forming bonds between the soil or aggregate particles. The key advantage of Soiltac® originates with its long, nanoparticle molecular structure that link and cross-link together. As the water dissipates from the soil or aggregate, a durable and water resistant matrix of flexible solid-mass is created. Once cured, Soiltac® becomes completely transparent, leaving the natural landscape to appear untouched.

Soiltac® results are based on the application rate used. Modest application rates are useful for dust suppression and erosion control by creating a three-dimensional cap or surface crust. Heavier rates can generate qualities similar to cement; useful for soil solidification and stabilization found in road building. By adjusting the application rate, Soiltac® can remain effective from weeks to several years. Most importantly, Soiltac® is a truly biodegradable product that is completely environmentally safe to use.

Soiltac® has been rigorously evaluated and its performance verified by the U.S. Army Engineering Research and Development Center (ERDC) against the industry's traditional top performing soil stabilizers and dust control agents. As a result, the Department of Defense continues to award Soilworks® with contracts to supply all branches of the Armed Forces globally, including operations in Iraq and Afghanistan. Its success with the U.S Military and Allied Forces has led to Soilworks® GSA contract (# GS-07F-5364P) and a complete listing of National Stock Numbers for the U.S. Department of Defense warehouses.

Soiltac's® advanced nanotechnology is modernizing the way we stabilize soils and aggregates in addition to controlling dust and erosion for a whole new generation. Soiltac® applications are extensive ranging from simple backyard trails and construction sites to heavy-lift military cargo runways and global transportation infrastructure.

Soilworks® is dedicated to economically solving soil stabilization challenges throughout the world's commercial, industrial and military markets. For more information about Soiltac®, please visit us online at www.soilworks.com or call 1-800-545-5420.

Respectfully,

A stylized, handwritten signature in black ink, appearing to read 'C. Falkenberg'.

Chad Falkenberg
CEO & Chairman

[Company Profile](#)[Counselling](#)[Strategic Partners](#)[Our References](#)[Contact Us](#)

Wednesday, 16 July 2014 22:31


[Home](#) > [Soiltac® Application Rates for Soil Stabilization & Dust Control](#)

OUR PRODUCTS

[Soiltac](#)[Durasoil](#)[Dowel Bars](#)[Underground tapes](#)[Cork](#)[Tiedown](#)[Aslan FRP](#)[Paintings and Coatings](#)[Micro reinforcements](#)[Download Catalogs](#)

QUALITY CERTIFICATE



GOOGLE TRANSLATION



Soiltac® Application Rates for Soil Stabilization & Dust Control

Topical only	Undiluted concentrate										Dilution				
	Standard					Metric					Parts Water	Traffic Area	gal./ Acre	gal./ SY	Life/ months
	ft²/ gal.	gal./ ft²	yd²/ gal.	gal./ yd²	gal./ acre	m²/ gal	gal./ m²	m²/ L	L/ m²						
Water Retention Basin & Pond Lining	20	0.0500	2.2	0.450	2178	1.9	0.538	0.5	2.04	2	No	6534	1.35	12-24	
Aircraft Runways (Heavy use)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	4	Yes	6223	1.29	12-24	
Aircraft Runways (single engine)	50	0.0200	5.6	0.180	871	4.6	0.215	1.2	0.81	6	Yes	6098	1.26	12-24	
Helicopter Landing Pads (Heavy Craft)	45	0.2220	5.0	0.200	968	4.2	0.239	1.1	0.91	5	Yes	5808	1.20	12-24	
Helicopter Landing Pads (Light Craft)	70	0.0143	7.8	0.129	622	6.5	0.154	1.7	0.58	8	Yes	5601	1.16	12-24	
Heavy Haul Roads & Mining Roads	60	0.0167	6.7	0.150	726	5.6	0.179	1.5	0.68	6	Yes	5082	1.05	12-24	
Military Convoy & Supply Roads	65	0.0154	7.2	0.138	670	6.0	0.166	1.6	0.63	6	Yes	4691	0.97	12-24	
Roads (High Traffic)	65	0.0154	7.2	0.138	670	6.0	0.166	1.6	0.63	6	Yes	4691	0.97	12-24	
Residential Driveways	65	0.0154	7.2	0.013	670	6.0	0.016	1.6	0.63	6	Yes	4691	0.97	12-24	
Parking Lots	65	0.0154	7.2	0.138	670	6.0	0.166	1.6	0.63	6	Yes	4691	0.97	12-24	
Roads (Light Traffic)	70	0.0143	7.8	0.129	622	6.5	0.154	1.7	0.58	7	Yes	4978	1.03	12-24	
Golf Course Bunker Liner	50	0.0200	5.6	0.180	871	4.6	0.215	1.2	0.81	5	Yes	5227	1.08	12-24	
Golf Course Cart Paths	80	0.0125	8.9	0.113	545	7.4	0.135	2.0	0.51	8	Yes	4901	1.01	12-24	
Walking Trails and Paths	100	0.0100	11.1	0.090	436	9.3	0.108	2.5	0.41	10	Yes	4792	0.99	12-24	
Road Sealer over Soiltec Stabilized Base	100	0.0100	11.1	0.090	436	9.3	0.108	2.5	0.41	4	Yes	2178	0.45	12-24	
BMX Tracks	120	0.0083	13.3	0.075	363	11.1	0.090	2.9	0.34	10	Yes	3993	0.83	9-16	
Temporary Parking Lots	120	0.0083	13.3	0.075	363	11.1	0.090	2.9	0.34	10	Yes	3993	0.83	1-3	
Temporary Roads & Detours	150	0.0067	16.7	0.600	290	13.9	0.072	3.7	0.27	13	Yes	4066	0.84	1-3	
Road Shoulders	160	0.0063	17.8	0.056	272	14.9	0.067	3.9	0.25	14	Yes	4084	0.84	12-24	
Slope Erosion Control (Steep Slope)	100	0.0100	11.0	0.090	436	9.0	0.108	2.9	0.41	5	Yes	2614	0.54	12-24	
Slope Erosion Control (Average Slope)	180	0.0056	20.0	0.050	242	17.0	0.060	4.0	0.23	10	Yes	2662	0.55	12-24	
Slope Erosion Control (Light Slope)	220	0.0045	24.0	0.041	198	20.0	0.049	5.0	0.19	12	No	2574	0.53	12-24	
Stock Pile Dust Capping (Steep Slope)	220	0.0045	24.0	0.014	198	20.0	0.049	5.0	0.19	9	No	1980	0.41	12-24	
Stock Pile Dust Capping (Average Slope)	270	0.0037	30.0	0.033	161	25.0	0.040	7.0	0.15	12	No	2097	0.43	12-24	
Stock Pile Dust Capping (Light Slope)	320	0.0031	36.0	0.028	136	30.0	0.034	8.0	0.13	14	No	2042	0.42	12-24	
Hazardous Material Capping & Sealing	160	0.0063	18.0	0.056	272	15.0	0.067	4.0	0.25	8	No	2450	0.51	12-24	
Landfill Capping & Reclamation	360	0.0028	40.0	0.025	121	33.0	0.030	9.0	0.11	10	No	1331	0.28	12-24	
Odor & Vapor Suppression	360	0.0028	40.0	0.025	121	33.0	0.030	9.0	0.11	20	No	2541	0.53	12-24	
Mine Tailings Capping & Reclamation	450	0.0022	50.0	0.020	97	42.0	0.024	11.0	0.09	12	No	1258	0.26	12-24	
Coal Rail Car Capping	1000	0.0010	111.0	0.009	44	93.0	0.011	25.0	0.04	29	No	1307	0.27	1+	
Dust Control (30 Days)	1250	0.0008	139.0	0.007	35	116.0	0.009	31.0	0.03	34	No	1220	0.25	1+	
Dust Control (90 days)	795	0.0013	88.0	0.011	55	74.0	0.014	20.0	0.05	21	No	1205	0.25	3+	
Dust Control (6 Months)	580	0.0017	64.0	0.016	75	54.0	0.019	14.0	0.07	15	No	1202	0.25	6+	
Dust Control (12 Months)	415	0.0024	46.0	0.022	105	39.0	0.026	10.0	0.10	11	No	1260	0.26	12+	
Dust Control (12-24 Months)	320	0.0031	36.0	0.028	136	30.0	0.034	8.0	0.13	8	No	1225	0.25	12-24	
Hydroseed & Hydromulch Tackifier	1740	0.0006	193.0	0.005	25	162.0	0.006	43.0	0.02	40	No	1026	0.21	3-6	
(Mixed-In/Processed)															

(Mixed-In/Processed)

Base Stabilization Light (4"-10cm deep)	45	0.0222	5.0	0.200	968	4.2	0.239	1.1	0.91	**
Base Stabilization Average (4"-10cm deep)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	**
Base Stabilization Heavy (4"-10cm deep)	25	0.0400	2.8	0.360	1742	2.3	0.431	0.6	1.63	**
Road Pot Hole Repair (4"-10cm deep)	25	0.0400	2.8	0.360	1742	2.3	0.431	0.6	1.63	**
Adobe Blocks & Earth Blocks (6"-15cm Tall)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	**
Base Stabilization Light (6"-15cm deep)	35	0.0286	3.9	0.257	1245	3.3	0.308	0.9	1.16	**
Base Stabilization Average (6"-15cm deep)	25	0.0400	2.8	0.360	1742	2.3	0.431	0.6	1.63	**
Base Stabilization Heavy (6"-15cm deep)	15	0.0667	1.7	0.600	2904	1.4	0.718	0.4	2.72	**

**Dilution rates for mix-in/processed applications are based on the difference between optimum moisture and in-situ moisture levels.

Please consult with your local Soiltac® representative to calculate recommended dilution rates for all mix-in applications.

Application coverage and dilution rates may vary depending on traffic volume, load bearing capacity, soil type, weather conditions, soil moisture levels and compaction. All Mixed-in/Processed applications require laboratory and on-site testing to determine optimal application and dilution rates.

Copyright © 2006-2008 **BiMA International Marketing Counseling Trade Plc.**

Yesilcam Sanayi Sitesi E Blok No:116 Ostim/ANKARA

Phone : +90.3122780581 - bima@bima.gen.tr

Developed by Etik | CMS Limbo

MATERIAL SAFETY DATA SHEET

SECTION 1 - MATERIAL IDENTIFICATION

PRODUCT NAME	SOILTAC*
MANUFACTURER	*SOILTAC is a registered trademark of Soilworks, LLC. Soilworks, LLC. 1750 East Northrop Blvd, Suite 250 Chandler, Arizona 85286-1747 USA www.soilworks.com 800-545-5420
TELEPHONE NUMBER	800-545-5420
ONLINE INFORMATION	www.Soiltac.com
EMERGENCY TELEPHONE NUMBERS	800-545-5420 (National & International)
REVISION DATE	November 2006 (<i>supersedes March 2006</i>)
PHYSICAL FORM	Mobile liquid
COLOR	Milky White (transparent once cured)
ODOR	Mild / Slight (no odor once cured)
C.A.S. CHEMICAL NAME	Mixture
SYNONYMS	Soil stabilizer, soil stabilization agent, soil solidifier, soil amendment, soil additive, soil crusting agent, dust control agent, dust inhibitor, dust palliative, dust suppressant, dust retardant
CHEMICAL FAMILY	Vinyl Copolymer Emulsion
EMPIRICAL FORMULA	Mixture
INTENDED USE	Soil stabilization, soil solidification, fugitive dust control, dust suppression, dust abatement, tackifier, dust abatement, PM ₁₀ and PM _{2.5} air quality control and erosion control

SECTION 2 - INGREDIENTS

	%	CAS Number	Chemical Name
1.	50-60	Proprietary	Vinyl Copolymer
2.	40-50	7732-18-5	Water

SECTION 3 - HEALTH HAZARDS

ROUTES OF ENTRY

Eye Contact, Skin Contact, Ingestion and Inhalation

SIGNS AND SYMPTOMS OF ACUTE EXPOSURE

Eyes: Direct contact with this material may cause eye irritation including lachrymation (tearing).

Inhalation: Inhalation of vapor or aerosol may cause irritation to the respiratory tract (nose, throat, and lungs).

Skin: Contact may cause skin irritation.

Ingestion: No hazard in normal industrial use.

SIGNS AND SYMPTOMS OF CHRONIC EXPOSURE

Prolonged or repeated contact with skin may cause irritation and dermatitis (inflammation).

CARCINOGENICITY

This material **does not** contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the Occupational Safety and Health Administration (OSHA) as a carcinogen.

SECTION 4 - FIRST AID

EYE CONTACT

Flush eyes with clean water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT

Remove contaminated clothing and shoes. Wash affected area with soap and water. Get medical attention if irritation develops or persists.

INHALATION

Move patient to fresh air. If breathing has stopped or is labored give assisted respiration (e.g. mouth-to-mouth). Supplemental oxygen may be indicated. Seek medical advice.

INGESTION

Give the victim one or two glasses of water or milk to drink. Get immediate medical attention. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE AND EXPLOSION DATA

FLASH POINT (closed cup)	Not applicable
UPPER EXPLOSION LIMIT (UEL)	Not applicable
LOWER EXPLOSION LIMIT (LEL)	Not applicable
AUTOIGNITION TEMPERATURE	Not applicable
FIRE HAZARD CLASSIFICATION (OSHA/NFPA)	Non-Combustible
EXTINGUISHING MEDIA	

Product does not burn. The product will only burn after the water it contains is driven off. For dry polymer use carbon dioxide, foam, dry chemical or water fog to extinguish fire. Aqueous solution **is not flammable**.

FIRE FIGHTING EQUIPMENT

Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing. Thoroughly decontaminate all protective equipment after use.

FIRE FIGHTING INSTRUCTIONS

Containers of this material may build up pressure if exposed to heat (fire). Use water spray to cool fire-exposed containers.

FIRE AND EXPLOSION HAZARDS

This material **will not burn** unless it is evaporated to dryness. Closed containers may rupture when exposed to extreme heat.

HAZARDOUS COMBUSTION PRODUCTS

When dried polymer burns, water (H₂O), carbon dioxide (CO₂), carbon monoxide (CO) and smoke are produced.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

CONTAINMENT TECHNIQUES (Removal of ignition sources, diking etc)

Stop the leak, if possible. Ventilate the space involved.

CLEAN-UP PROCEDURES

Wear suitable protective equipment. If recovery is not feasible, admix with dry soil, sand or non-reactive absorbent and place in an appropriate chemical waste container. Prevent spilled material from entering sanitary sewers, storm sewers, drainage systems and from entering bodies of water or ditches that lead to waterways. Transfer to containers by suction, preparatory for later disposal. Place in metal containers for recovery or disposal. Flush area with water spray. Wash contaminated property (e.g., automobiles) quickly before the material dries. For large spills, recover spilled material with a vacuum truck.

OTHER EMERGENCY ADVICE

Spilled polymer emulsion is very slippery. Use care to avoid falls. A film will form on drying. Remove saturated clothing and wash contacted skin area with soap and water. Product imparts a milky white color to contaminated waters. Foaming may result. Sewage treatment plants may not be able to remove the white color imparted to the water.

SECTION 7 - HANDLING AND STORAGE

STORAGE

Keep from freezing. Store in a dry area. Keep containers closed when not in use to minimize contact with atmospheric air and prevent inoculation with microorganisms.

HANDLING

Use only in well-ventilated areas. Avoid contact with eyes. Avoid breathing vapors. Avoid prolonged or repeated contact with skin. Wash hands thoroughly after handling and before eating or drinking.

SECTION 8 - PERSONAL PROTECTION / EXPOSURE CONTROLS

EXPOSURE GUIDELINES

There are no Occupational Safety and Health (OSHA) Permissible Exposure Limits (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) or Short Term Exposure Limits (STEL) established for the component(s) of this product.

EYE PROTECTION

Chemical safety glasses.

HAND PROTECTION

Rubber Gloves. The breakthrough time of the selected glove(s) must be greater than the intended use period.

RESPIRATORY PROTECTION

Not required under normal use.

PROTECTIVE CLOTHING

No specific recommendation.

ENGINEERING CONTROLS

Good general ventilation should be sufficient to control airborne levels of irritating vapors.



Soilworks, LLC®

1750 E. Northrop Blvd., Ste. 250, Chandler, AZ 85286
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Global Manufacturer & Distributor of
Soiltac® / powdered soiltac®
Durasoil® and Gorilla-snot®

SECTION 9 - TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM	liquid
COLOR	Milky White (transparent once cured)
ODOR	Mild / Slight (no odor once cured)
pH	4.5-6.0
EVAPORATION RATE	< 1 (BuAc=1)
VAPOR DENSITY	> 1 (Air = 1)
BOILING POINT	>100.00°C (>212.00°F)
FREEZING POINT	<0°C (<32°F)
SOLUBILITY IN WATER	Completely (100%) (until cured)
SPECIFIC GRAVITY (Water = 1)	1.05-1.10

SECTION 10 - STABILITY AND REACTIVITY

STABILITY

Stable at ambient temperatures. Coagulation may occur following freezing, thawing or boiling.

INCOMPATIBILITY (Materials to Avoid)

No incompatibilities have been identified.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition may form: Acetic acid and Acrolein. Thermal decomposition may produce various hydrocarbons and irritating, acrid vapors.

HAZARDOUS POLYMERIZATION

Will not occur

CONDITIONS TO AVOID

Freezing temperatures (until cured).

SECTION 11 - TOXICOLOGICAL PROPERTIES

ACUTE EYE TOXICITY

No Information is available.

ACUTE ORAL TOXICITY

No Information is available.

ACUTE SKIN TOXICITY

No Information is available.

ACUTE INHALATION TOXICITY

No Information is available.

CHRONIC/CARCINOGENICITY

This material **does not** contain 0.1% or more of any chemical listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or regulated by the Occupational Safety and Health Administration (OSHA) as a carcinogen.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICITY

Common Name	Species	Test	Result	Concentration
Green Algae	Raphidocelus Subcapitata	96-hr chronic LC50	>1,000	Undiluted
Fathead Minnow	Pimephales Promelas	96-hr acute LC50	>1,208	Undiluted
Rainbow Trout	Oncorhynchus Mykiss	96-hr acute LC50	>1,000	Undiluted

ENVIRONMENTAL FATE

No data is available.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

This material **is not** a RCRA hazardous waste. Disposal of this material is not regulated under RCRA. Consult federal, state and local regulations to ensure that this material and its containers, if discarded, is disposed of in compliance with all regulatory requirements. NOTE: As supplied or diluted, product material (foam included), when splashed on automobiles or other personal property, is difficult to remove if allowed to dry.

RCRA HAZARD CLASS

This material **is not** a RCRA hazardous waste. When discarded in its purchased form, this material would not be regulated as a RCRA Hazardous waste under 40 CFR 261.



Soilworks, LLC®

1750 E. Northrop Blvd., Ste. 250, Chandler, AZ 85286
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Global Manufacturer & Distributor of
Soil tac® / powdered soil tac®
Durasoil® and Gorilla-snot®

SECTION 14 - TRANSPORT INFORMATION

DOT NON-BULK SHIPPING NAME	Refer to Bill of Lading - Not DOT Regulated // Keep From Freezing // Not dangerous goods
DOT BULK SHIPPING NAME	Refer to Bill of Lading.
IMO SHIPPING DATA	Refer to Bill of Lading.
ICAO/IATA SHIPPING DATA	Refer to Bill of Lading - Not IATA Regulated // Keep From Freezing // Not dangerous goods
CFR	Not Regulated // Keep From Freezing // Not dangerous goods
IMDG	Not Regulated // Keep From Freezing // Not dangerous goods
CTC	Not Regulated // Keep From Freezing // Not dangerous goods

SECTION 15 - REGULATORY INFORMATION

TSCA SECTION 8(b) INVENTORY STATUS

All components are included in the EPA Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

TSCA SECTION 12(b) EXPORT NOTIFICATION

This material **does not** contain any components that are subject to the U.S. Toxic Substances Control Act (TSCA) Section 12 (b) Export Notification requirements.

OSHA Hazard Communication Standard (29CFR1910.1200) hazard class(es)

This material **is not** classified as hazardous under the criteria of the U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR 1910.1200

EPA SARA Title III Section 304 CERCLA

Reportable quantities have not been established for any of this material's components.

EPA SARA Title III Section 311/312 HAZARD COMMUNICATION STANDARD (HCS)

This material **is not** a hazardous chemical.

EPA SARA Title III Section 313 TOXIC CHEMICAL LIST (TCL)

This product **does not** contain Section 313 Reportable Ingredients.

CANADIAN INVENTORY STATUS

All components of this material are listed on the Canadian Domestic Substances List (DSL)

CANADIAN WHMIS

This material **is not** classified as a controlled product under the Canadian Workplace Hazardous Material Information System.

ADDITIONAL CANADIAN REGULATORY INFORMATION

This product **does not** contain a substance present on the WHMIS Ingredient Disclosure List (IDL) which is at or above the specified concentration limit.

EUROPEAN INVENTORY STATUS (EINECS)

The polymer portion of this product is manufactured from reactants which are listed on EINECS and meets the EINECS definition of an exempt polymer.

AICS (Australia)

Included on inventory

ENCS (Japan)

Included on inventory

ECL (South Korea)

Included on inventory

SEPA (China)

Included on inventory

SECTION 16 – OTHER INFORMATION


HMIS and NFPA Classification

Health	: 1
Flammability	: 0
Reactivity	: 0
Special Hazard	: 0

DUST CONTROL AND AIR MONITORING PLAN

APPENDIX B

**AIR PERMIT TO CONSTRUCT
PORTABLE ROCK CRUSHING PLANT**

State of Idaho Department of Environmental Quality PERMIT TO CONSTRUCT AN AIR POLLUTION EMITTING SOURCE		PERMIT NUMBER <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">7</div> <div style="border: 1px solid black; padding: 2px;">7</div> <div style="border: 1px solid black; padding: 2px;">7</div> <div style="margin: 0 5px;">-</div> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">6</div> <div style="border: 1px solid black; padding: 2px;">6</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 30%;"> AQCR <div style="border: 1px solid black; width: 40px; height: 20px; margin: 2px;"></div> </div> <div style="width: 30%;"> CLASS <div style="border: 1px solid black; padding: 2px; display: inline-block;">S M</div> </div> <div style="width: 30%;"> SIC <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 4 4 2</div> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 30%;"> ZONE <div style="border: 1px solid black; width: 40px; height: 20px; margin: 2px;"></div> </div> <div style="width: 40%;"> UTM COORDINATE (km) <div style="display: flex; align-items: center; margin: 2px;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="margin: 0 5px;">.</div> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="margin: 0 5px;">.</div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> </div> </div>			
1. PERMITTEE Gale Lim Construction, Inc.					
2. PROJECT Portable Rock Crushing Plant					
3. MAILING ADDRESS 921 West 250 South		CITY Blackfoot		STATE Idaho	ZIP CODE 83221
4. SITE LOCATION COUNTY Portable	NO. OF FULL-TIME EMPLOYEES 3		PROPERTY AREA AT SITE (Acreage) Varies		
5. PERSON TO CONTACT Gale Lim		TITLE President		TELEPHONE (208) 684-9299	
6. EXACT PLANT LOCATION Portable					
7. GENERAL NATURE OF BUSINESS & KINDS OF PRODUCTS Rock Crushing (Including Aggregate, Asphalt, and Concrete Production when Collocated)					
8. GENERAL CONDITIONS <p>This permit is issued according to the <i>Rules for the Control of Air Pollution in Idaho</i>, Section 58.01.01.200, and pertains only to emissions of air contaminants that are regulated by the State of Idaho and to the sources specifically allowed to be constructed by this permit.</p> <p>This permit (a) does not affect the title of the premises upon which the equipment is to be located, (b) does not release the Permittee from any liability for any loss due to damage to person or property caused by, resulting from, or arising out of the design, installation, maintenance, or operation of the proposed equipment, (c) does not release the Permittee from compliance with other applicable federal, state, tribal, or local laws, regulations, or ordinances, (d) in no manner implies or suggests that the Idaho Department of Health and Welfare, Division of Environmental Quality (DEQ) or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to damage to person or property caused by, resulting from, or arising out of design, installation, maintenance, or operation of the proposed equipment.</p> <p>This permit is not transferable to another person, place, piece or set of equipment. This permit will expire if construction has not begun within two years of its issue date or if construction is suspended for one year.</p> <p>This permit has been granted on the basis of design information presented with its application. Changes of design or equipment that result in any change in the nature or amount of emissions must be approved in advance by DEQ unless exempted by the <i>Rules for the Control of Air Pollution in Idaho</i> Sections 220 through 225.</p>					
 FOR MARK DIETRICH REGIONAL ADMINISTRATOR, POCATELLO REGIONAL OFFICE DEPARTMENT OF ENVIRONMENTAL QUALITY				DATE: August 11, 2000	

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

A. STATEWIDE REQUIREMENTS

The Permittee shall comply with the following sourcewide conditions when the rock crushing facility is operated anywhere (nonattainment, attainment, or unclassifiable areas) within the state of Idaho.

A.1 EMISSION LIMITS

A.1.1 Crusher Opacity Limit

Particulate matter (PM) emissions from portable rock crushers shall not exhibit more than fifteen percent (15%) opacity. Opacity shall be determined using the procedures specified in IDAPA 58.01.01.625 (*Rules for the Control of Air Pollution in Idaho*).

A.1.2 Transfer Point Opacity Limit

PM emissions from any transfer point on belt conveyors, or from each grinding mill, screening operation, bucket elevator, belt conveyor bagging operation, storage bin, enclosed truck, or rail car loading station shall not exhibit greater than ten percent (10%) opacity. Opacity shall be determined using the procedures specified in IDAPA 58.01.01.625.

A.1.3 Opacity Limit

Emissions emanating from any stack, vent, or other functionally equivalent opening, shall not exceed twenty percent (20%) opacity for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period as required in IDAPA 58.01.01.625. Opacity shall be determined using the procedures contained in IDAPA 58.01.01.625.

A.1.4 Visible Emission Limits at Property Boundary

Fugitive emissions shall not be observed leaving the property boundary for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period. Visible emissions shall be determined by Method 22, as described in 40 CFR Part 60, Appendix A, or a DEQ-approved alternative method.

A.2 OPERATING REQUIREMENTS

A.2.1 Number of Crushers and Generators

The rock crushing facility shall not use more than four (4) crushers and one (1) 945-kilowatt (945-kW) generator(s).

DATE: August 11, 2000

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

A.2.2 Reasonable Control of Fugitive Emissions

All reasonable precautions shall be taken to prevent PM from becoming airborne as required in IDAPA 58.01.01.651. In determining what is reasonable, considerations will be given to factors such as the proximity of dust-emitting operations to human habitations and/or activities and atmospheric conditions which might affect the movement of PM. Some of the reasonable precautions include, but are not limited to, the following:

- A.2.2.1 Use, where practical, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of lands;
- A.2.2.2 Application, where practical, of asphalt, water, or suitable chemicals to dirt roads, material stockpiles, and other surfaces which can create dust;
- A.2.2.3 Installation and use, where practical, of hoods, fans, and fabric filters or equivalent systems to enclose and vent the handling of dusty materials. Adequate containment methods should be employed during sandblasting or other operations;
- A.2.2.4 Covering, where practical, of open-bodied trucks transporting materials likely to give rise to airborne dusts;
- A.2.2.5 Paving of roadways and their maintenance in a clean condition, where practical; or
- A.2.2.6 Prompt removal of earth or other stored material from streets, where practical.

A.2.3 Fugitive Dust Control Plan

Within sixty (60) days of issuance of the permit, the permittee shall have developed and submitted to the appropriate DEQ Regional Office a Fugitive Dust Control Plan for the crushing facility. Upon DEQ approval, the Fugitive Dust Control Plan shall become an enforceable part of this permit. This plan shall include the following information:

- A.2.3.1 Identify and list all areas of operations where fugitive dust may be generated (i.e., haul roads, vehicle traffic areas, storage piles, transfer points, etc.).
- A.2.3.2 For each fugitive dust source listed, identify and describe the type of control methods and procedures to be used to control fugitive emissions (i.e., application of water or chemical dust suppressants, covering open trucks transporting dusty material, paving of roadways, etc.).
- A.2.3.3 The plan shall include a log to record when each fugitive dust source is controlled and the type of control used. A sample copy of the log shall be submitted to DEQ with the Fugitive Dust Control Plan for DEQ approval.

DATE: August 11, 2000

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

A.3 MONITORING AND RECORDKEEPING REQUIREMENTS

A.3.1 Monitor Facility Throughput

The Permittee shall monitor and record the total throughput of aggregate to the crushing facility in tons per day (T/day) and tons per year (T/yr). The most recent two (2) years' compilation of data shall be kept on site, in a log, and shall be made available to DEQ representatives upon request.

A.3.2 Reasonable Control Measures

The Permittee shall monitor and record in a log, during operation, the periodic method(s) used to reasonably control fugitive emissions from this facility. The log shall include the type of control used (e.g., water, environmentally safe chemical dust suppressants, spray bars, screen deck covers, etc.) as well as the circumstances under which no controls are used. The most recent two (2) years' compilation of data shall be kept on site and shall be made available to DEQ representatives upon request.

A.3.3 Monitor Generator Hours of Operation

The Permittee shall monitor and record the generator's hours of operation on a monthly basis if generator hours of operation are limited in sections B, C, or D of this permit. The most recent two (2) years' compilation of data shall be kept on site, in a log, and shall be made available to DEQ representatives upon request.

A.3.4 40 CFR 60.675 Initial Performance Testing Requirements

The Permittee shall conduct a performance test on the rock crushing facility in accordance with 40 CFR 60.675, IDAPA 58.01.01.157 and General Provision F of this permit. The performance test shall be conducted to demonstrate compliance with the applicable particulate matter standards defined in 40 CFR 60.672.

If the rock crushing facility has previously conducted a performance test in accordance with 40 CFR 60.675 which demonstrates compliance with the applicable standards, then an additional performance test is not required by this Section of the permit. The Permittee shall maintain a copy of the performance test results of the most recently conducted test on this rock crushing facility. This report shall be made available to DEQ representatives upon request.

A.3.5 Visible Emissions Testing

The Permittee shall conduct a visual determination of emissions at the property boundary in accordance with IDAPA 58.01.01.157 and General Provision F of this permit.

DATE: August 11, 2000

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

A.3.6 Fuel Sulfur Content

The sulfur content in the Number 2 fuel oil (ASTM Grade 2) shall not exceed 0.5 percent by weight as required in IDAPA 58.01.01.728.

A.4 REPORTING REQUIREMENTS

A.4.1 Performance Test Protocol

Prior to conducting any emission test, the Permittee is strongly encouraged to submit in writing to DEQ, at least thirty (30) days in advance, a performance test protocol in accordance with IDAPA 58.01.01.157.01.a.

A.4.2 Performance Test Report

In accordance with IDAPA 58.01.01.157.04, the Permittee shall submit a written report of the performance test results to DEQ within thirty (30) days of completion of the test.

A.4.3 Relocation

A.4.3.1 All existing portable equipment shall be registered. At least ten (10) days prior to relocation of any equipment covered by this permit, the Permittee shall submit a complete Portable Equipment Registration and Relocation Form (available on the DEQ website at: <http://www2.state.id.us/deq/air/air1.htm>) in accordance with IDAPA 58.01.01.500 and a scaled plot plan to:

PERF Processing Unit
Idaho DEQ - Air Quality
1410 North Hilton
Boise, Idaho 83706-1255

A.4.3.2 The Permittee may also be required to submit a Fugitive Dust Control Plan, as described in Section A.2.3, to the DEQ Regional Office in charge of the region to which the facility wishes to relocate.

A.4.4 Certification of Documents

All documents including, but not limited to, application forms for Permits to Construct, monitoring data, supporting information, requests for confidential treatment, testing reports, and compliance certifications submitted to DEQ shall contain a certification by a responsible official. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

DATE: August 11, 2000

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

B. ATTAINMENT OR UNCLASSIFIABLE AREA REQUIREMENTS WHEN NOT COLLOCATED

The Permittee shall comply with the conditions in Section A of this permit and the following permit conditions when the rock crushing facility is operated in any attainment or unclassifiable areas, and when it is not collocated, within the state of Idaho.

B.1 OPERATING REQUIREMENTS

B.1.1 Facility Throughput Limits

The production rate of the rock crushing facility shall not exceed a maximum of one million three hundred forty thousand, eight hundred sixty-eight tons per any consecutive 12-month period (1,340,868 T/yr) when located in any attainment or unclassifiable area.

B.1.2 Collocation Requirements

When the rock crushing facility is to be collocated with another portable rock crushing plant, concrete batch plant, or hot-mix asphalt plant, the collocation requirements of Section C of this permit must be complied with.

B.1.3 Generator Hours of Operation

The generator shall not be operated more than seven thousand three hundred twenty-three hours per any consecutive 12-month period (7,323 hr/yr) when located in any attainment or unclassifiable area.

DATE: August 11, 2000

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

C. ATTAINMENT OR UNCLASSIFIABLE AREA REQUIREMENTS WHEN COLLOCATED

The Permittee shall comply with the conditions in Section A of this permit and the following permit conditions when the rock crushing facility is to be collocated with another portable rock crushing plant, concrete batch plant, or hot-mix asphalt plant within the state of Idaho. The rock crusher may only collocate with either one (1) portable concrete batch plant, one (1) portable hot-mix asphalt plant, or one (1) other portable rock crusher which has been permitted to specifically allow collocation.

C.1 OPERATING REQUIREMENTS

C.1.1 Collocation Areas

The rock crushing facility may collocate in attainment or unclassifiable areas only. The Permittee shall not collocate in a nonattainment area or proposed nonattainment area without obtaining a permit which specifically allows for collocation in a nonattainment area.

C.1.2 Number of Portable Sources

The rock crushing facility may only collocate with either one (1) portable concrete batch plant, one (1) portable hot-mix asphalt plant, or one (1) other portable rock crushing plant which has been permitted to specifically allow collocation.

C.1.3 Facility Throughput Limits

The production rate of the rock crushing facility shall not exceed a maximum of six hundred seventy thousand four hundred thirty four tons per any consecutive 12-month period (670,434 T/yr) when collocated with another rock crushing plant, concrete batch plant, or hot-mix asphalt plant.

C.1.4 Generator Hours of Operation

The generator shall not be operated more than three thousand six hundred sixty-two hours per consecutive 12-month period (3,662 hr/yr) when collocated with another rock crushing plant, concrete batch plant, or hot-mix asphalt plant.

DATE: August 11, 2000

**PERMIT TO CONSTRUCT
PERMITTEE, PROJECT, AND LOCATION**

Gale Lim Construction, Inc.
Rock Crushing Plant
Portable

PERMIT NUMBER

7 7 7 - 0 0 2 6 6

SOURCE

Portable Rock Crusher

D. NONATTAINMENT AREA REQUIREMENTS

The Permittee shall comply with the conditions in Section A of this permit and the following permit conditions whenever the rock crushing facility is operated in areas designated as nonattainment for particulate matter with an aerodynamic diameter of less than or equal to a nominal ten (10) microns (PM-10) within the state of Idaho. While operating the rock crushing facility under the conditions set forth in Section D, the rock crusher may not collocate with any other facility.

D.1 OPERATING REQUIREMENTS

D.1.1 Facility Throughput Limits

The production rate of the rock crushing facility shall not exceed a maximum of one million three hundred forty thousand, eight hundred sixty eight tons per any consecutive 12-month period (1,340,868 T/yr) when located in any PM-10 nonattainment area or proposed PM-10 nonattainment area.

D.1.2 Collocation Requirements

The rock crushing facility shall not be collocated with another portable rock crushing, concrete batch, or hot-mix asphalt plant when located in any PM-10 nonattainment area or proposed PM-10 nonattainment area.

D.1.3 Generator Hours of Operation

The generator shall not be operated more than seven thousand three hundred twenty-three hours per any consecutive 12-month period (7,323 hr/yr) when located in any PM-10 nonattainment area or proposed PM-10 nonattainment area.

DATE: August 11, 2000

PERMIT TO CONSTRUCT GENERAL PROVISIONS

- A. All emissions authorized herein shall be consistent with the terms and conditions of this permit and the *Rules for the Control of Air Pollution in Idaho*. The emission of any pollutant in excess of the limitations specified herein, or noncompliance with any other condition or limitation contained in this permit, shall constitute a violation of this permit and the *Rules for the Control of Air Pollution in Idaho*, and the Environmental Protection and Health Act, Idaho Code 39-101, et.seq.
- B. The Permittee shall at all times (except as provided in the *Rules for the Control of Air Pollution in Idaho*) maintain in good working order and operate as efficiently as practicable, all treatment or control facilities or systems installed or used to achieve compliance with the terms and conditions of this permit and other applicable Idaho laws for the control of air pollution.
- C. The Permittee shall allow the Director, and/or the authorized representative(s), upon the presentation of credentials:
1. To enter at reasonable times upon the premises where an emission source is located, or in which any records are required to be kept under the terms and conditions of this permit; and
 2. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit, to inspect any monitoring methods required in this permit, and require stack emission testing in conformance with IDAPA 58.01.01.157 when deemed appropriate by the Director.
- D. Nothing in this permit is intended to relieve or exempt the Permittee from compliance with any applicable federal, state, or local law or regulation, except as specifically provided herein.
- E. The Permittee shall notify DEQ, in writing, of the required information for the following events within five (5) working days after occurrence:
1. Initiation of Construction - Date
 2. Completion/Cessation of Construction - Date
 3. Actual Production Startup - Date
 4. Initial Date of Achieving Maximum Production Rate - Production Rate and Date
- F. If emission testing is specified, the Permittee must schedule such testing within sixty (60) days after achieving the maximum production rate, but not later than one hundred and eighty (180) days after initial startup. Such testing must **strictly** adhere to the procedures outlined in IDAPA 58.01.01.157 and shall not be conducted on weekends or state holidays without prior written DEQ approval. Testing procedures and specific time limitations may be modified by DEQ by prior negotiation if conditions warrant adjustment. DEQ shall be notified at least fifteen (15) days prior to the scheduled compliance test. Any records or data generated as a result of such compliance test shall be made available to DEQ upon request.
- The maximum allowable operating rate shall be limited to 120% of the average operating rate attained during any performance test period, for which a test protocol has been granted prior approval by DEQ, unless (1) the test demonstrates noncompliance, (2) a more restrictive operating limit is specified elsewhere in this permit, or (3) at such an operating rate, emissions would exceed any emission limit(s) set forth in this permit.
- G. The provisions of this permit are severable, and if any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

DATE: August 11, 2000

Fugitive Dust Control Plan

(Portable rock Crushing Plant PTC No. 777-00039 & 777-0026)

To control fugitive dust emissions, Gale Lim Construction has developed the following plan for the following fugitive dust generating sources:

- Unpaved haul roads
- Conveyor transfer points and crushers
- Gravel Stockpiles

Unpaved haul roads

Fugitive dust control methods from unpaved haul roads include:

- Apply water to the surface of the unpaved haul roads
- Limit vehicle speeds

Conveyor transfer points and crushers

Fugitive dust control methods from conveyor transfer points and crushers include:

- Sprayers will be used at transfer points and on crushers
- Water down fines piles when needed
- Apply controls on a frequency that prevent visible fugitive emissions

Gravel stockpiles

Fugitive dust control methods from stockpiles include:

- Apply water to the surface of the stockpile
- Limit the disturbance of the stockpiles

Fugitive dust controls will be logged daily on company DEQ Log .